PB90-124579

Superfund Record of Decision (EPA Region 5): Bower's Landfill, OH (First Remedial Action), March 1989

(U.S.) Environmental Protection Agency, Washington, DC

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The 12-acre Bowers Landfill site is in rural Pickaway County, Ohio, within the Scioto River floodplain. Fifteen residences lie within a 0.5-mile radius of the site. Information on the types and quantities of waste disposed of at the site is not readily available; however, landfill operations, which started in 1958, consisted solely of municipal refuse disposal until 1963. From 1963 to 1968, however, industrial refuse and chemical wastes were also disposed of at the site. Operations ended in 1968. The primary contaminants of concern affecting the soil, sediment, debris, and ground water are VOCs including PCE and benzene, other organics including PAHs and PCBs, metals including lead and chromium, and other inorganics.

The selected remedial action for this site includes removal of surface vegetation and debris such as domestic waste and drums followed by offsite disposal at a hazardous waste landfill or solid waste landfill if wastes are determined to be nonhazardous; erosion controls including surface regrading in areas prone to flooding and erosion; excavation and dewatering of drainage ditch sediment followed by onsite disposal; replacement of the discharge pipe; construction of a soil and clay cap with quarterly inspections for leachate and gas formation; implementation of site access and ground water use restrictions; and ground water monitoring. The estimated present worth cost for this remedial action is $4,300,000, which includes annual O&M costs of $116,000.

17. Document Analysis a. Descriptors

Record of Decision - Bowers Landfill, OH
First Remedial Action - Final
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March 1989

EPA

Superfund Record of Decision:

Bower's Landfill, OH

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RECORD OF DECISION SUMMARY
BOWERS LANDFILL
CIRCLEVILLE, OHIO

March 24, 1989
U.S. Environmental Protection Agency
Region V

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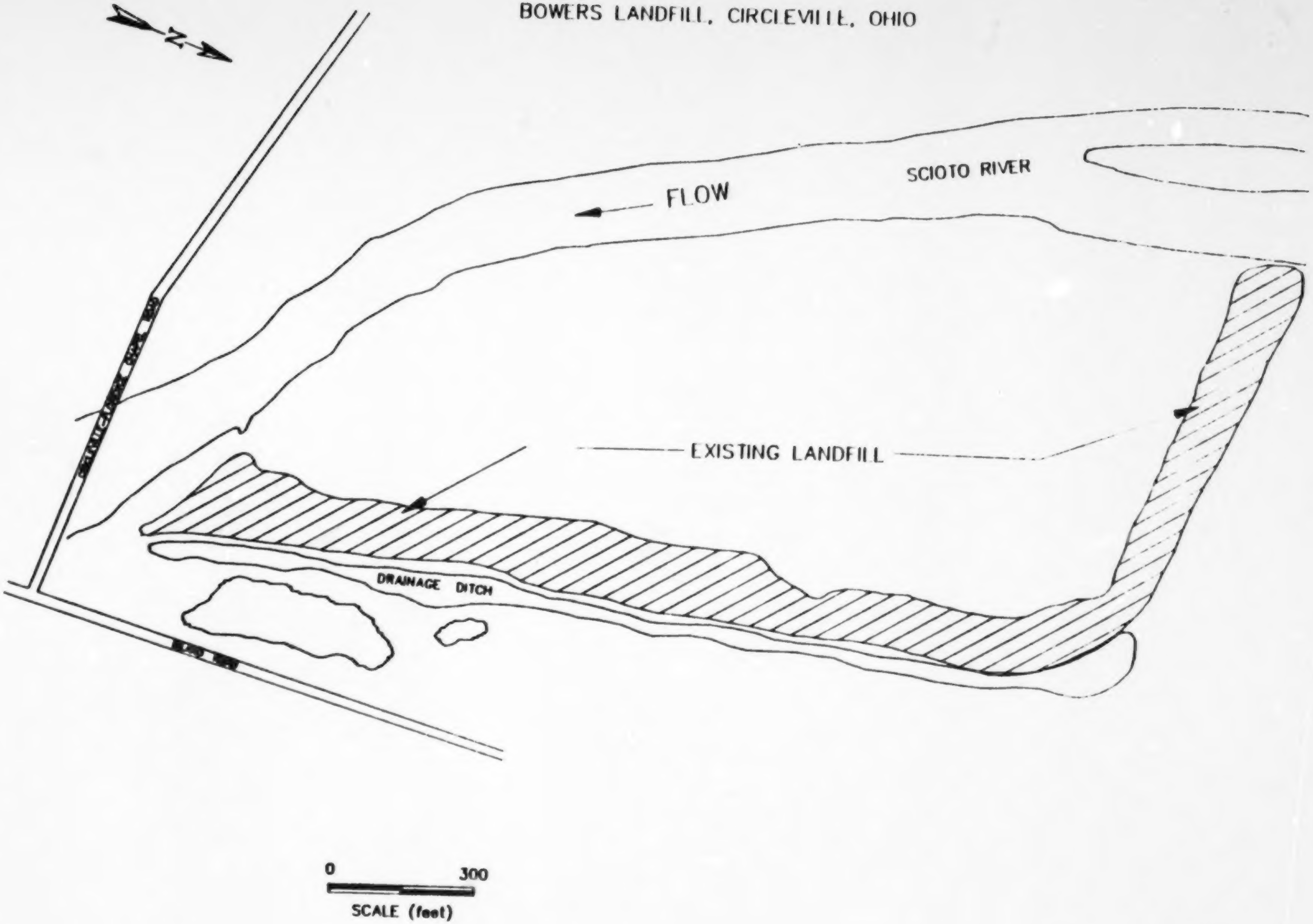
FIGURE 1
BOWERS LANDFILL, CIRCLEVILLE, OHIO


N
FLOW
SCIOTO RIVER
EXISTING LANDFILL
DRAINAGE DITCH
0
300
SCALE (feet)

RECORD OF DECISION SUMMARY
BOWERS LANDFILL
CIRCLEVILLE, OHIO

1.0 SITE NAME, LOCATION, AND DESCRIPTION

Bowers Landfill is located in rural Pickaway County, Ohio, approximately 2.5 miles north of the City of Circleville. The site is just northwest of the intersection of Island Road and Circleville - Florence Chapel Road, on the east side of the Scioto River Valley. The landfill lies within the Scioto River floodplain. Its northwestern and southern-most points abut the Scioto River (Figure 1).

The landfill occupies about 12 acres of a 202-acre tract owned by the estate of Dr. John M. Bowers. The landfill was constructed as a berm approximately 4,000 feet long with an average width of 125 feet and a top height of approximately 10 feet above grade. The reported waste volume of the landfill is approximately 130,000 cubic yards. The landfill has an established cover of vegetation, including small trees, but miscellaneous debris is exposed where the landfill surface has been eroded. The area east of the site is a natural topographic high with the elevation on Island Road about 50 feet higher than the landfill. This topography has been modified by quarrying activities to the east and northeast of the site. The north and west sides of the landfill are bordered by agricultural fields.

Since the landfill lies within the Scioto River floodplain, it is flooded regularly. The field west of the landfill is inundated an average of 29 days per year, and parts of the landfill are overtopped by flood waters an average of every 2 years. Flood waters and precipitation generally flow west and south toward the Scioto River. A drainage ditch lies immediately east of the landfill. Water in this ditch flows through a pipe under the southern end of the landfill and discharges to the Scioto River. A ditch on the west side of the landfill is not well developed and does not discharge to the river. Water in this ditch tends to pond near the southern end of the landfill.

The site area is rural, with 15 houses located within a ½-mile radius of the landfill. Houses in this area largely depend on private wells for water supply. However, no downgradient wells are within 1 mile of the site. The City of Circleville's water supply wells are located about 1-1/2 miles south of the site.

A more complete description of the site can be found in the Remedial Investigation Report (dated August 22, 1988) and the Feasibility Study Report (dated February 3, 1989).

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

Dr. Bowers began operating the landfill in 1958. Little information is available on the types and quantities of wastes disposed of at Bowers Landfill. Much of the information was supplied by interviews with individuals familiar with landfill operations. However, these interviews were conducted 15 to 20 years after site operations ended. Information from Ohio EPA (OEPA) files indicates that residential type waste, collected by private haulers in and around Circleville, accounts for most of the material in Bowers Landfill. No industrial dumping at the site was reported before 1963. Between 1963 and 1968, in addition to general domestic and industrial refuse, the site received chemical wastes originating from local industries, including E.I. DuPont deNemours & Company (DuPont) and Pittsburgh Plate Glass, Inc. (now PPG Industries, Inc.). DuPont and PPG reported sending 6,000 and 1,700 tons of waste, respectively, to Bowers Landfill between 1965 and 1968.

Waste disposal practices consisted largely of dumping waste directly onto the ground and covering it with soil. However, there are some indications that the southern part of the landfill may have been excavated for waste disposal. Waste was also burned at the site; the extent and dates of waste burning are not known. Landfilling at the site ended around 1968. The site was not secured when landfilling ended, and the cover material of sand, gravel, and some topsoil was characterized as "not sufficient" during a 1971 inspection by the Pickaway County Health Department.

In 1980, U.S. EPA collected and analyzed surface water samples from the site area; the results indicated that some contaminants were being released from the landfill. U.S. EPA subsequently required Dr. Bowers to commission an environmental study of the site. During the study, three wells were installed to monitor ground-water quality. These and a number of existing private wells and surface water points near the site were sampled. Volatile organic compounds (VOC), including ethylbenzene, toluene, and xylene, were found in downgradient monitoring wells immediately west of the site. However, no VOCs were detected in an upgradient well east of the site.

In 1982, based on the levels of organic contaminants measured in water samples from the site, Ohio EPA (OEPA) requested that the site be placed on the National Priorities List (NPL) as a Superfund site. In 1985, U.S. EPA and OEPA signed a consent order with DuPont and PPG, two of the potentially responsible parties (PRP). This order outlined the scope and schedule for a remedial investigation (RI) and feasibility study (FS) at Bowers Landfill. DuPont and PPG have assumed responsibility for the site investigation. Dames & Moore, under contract to the PRPs, conducted the RI and FS.

RI field activities began in July 1986 and included two phases, a first phase to characterize contaminant levels at the site and a second phase to answer questions raised by the first phase. During the first phase, 18 monitoring wells were installed at or near the landfill and sampled twice. Ground water from four off-site residential wells was sampled once. Sediment and surface water were sampled twice, and surficial soils were sampled once. This first phase of sampling was completed in May 1987. The second phase of the RI was conducted during February and March 1988. The major purposes of the second phase were (1) to assess ground-water flow direction in the deeper of the two aquifers that underlie the site and (2) to collect additional ground-water and soil samples. Two additional monitoring wells were installed during the second phase, and five wells (including the two new wells) were sampled. In addition, soil samples were collected from 10 locations. Dames & Moore prepared a Remedial Investigation Report (dated August 22, 1988) describing these activities.

Dames & Moore began the FS in early 1988. The FS was based on the results from the RI and also on the results of an endangerment assessment (EA) prepared by a U.S. EPA contractor. Nine remedial alternatives for Bowers Landfill, including the "no action" alternative, were evaluated in the FS. Dames & Moore prepared a Feasibility Study Report (dated February 3, 1989) to describe the development and evaluation of these alternatives.

Following completion of the RI and FS, U.S. EPA sent a special notice letter to the PRPs on March 1, 1989. This letter indicates U.S. EPA's willingness to allow the PRPs to carry out the design and implementation of U.S. EPA's preferred remedial alternative for Bowers Landfill. During the FS process, both U.S. EPA and OEPA reviewed the PRPs' preference for a remedial alternative. However, for reasons outlined in this decision summary, U.S. EPA has selected a different alternative. Technical discussions between the agencies and the PRPs, concerning the selection of a remedial alternative, are summarized in the Administrative Record for Bowers Landfill.

3.0 COMMUNITY RELATIONS HISTORY

U.S. EPA has conducted an extensive community relations program in conjunction with the Bowers Landfill RI/FS. Between November 7, 1985, and November 2, 1988, 12 meetings of the Bowers Landfill Information Committee were held in Circleville, Ohio. The Information Committee consists of representatives from U.S. EPA, OEPA, the PRPs, local (city and county) government, and citizens' groups. These meetings were held at regular intervals to keep the public informed of progress during the RI/FS and to discuss upcoming events. During the meetings, U.S. EPA, OEPA, and the PRPs made formal presentations to the committee on topics such as well installation and sampling methods; sampling results for soil, ground water, surface water, and sediment; endangerment assessment results; applicable or relevant and appropriate requirements (ARARs); and remedial alternatives developed in the FS. Following the presentations, U.S. EPA, OEPA, and the PRPs discussed these topics with the committee and answered questions from committee members.

As part of its community relations program, U.S. EPA has maintained an information repository at the Pickaway County District Library, 165 East Main Street, Circleville, Ohio. All formal reports submitted by the PRPs during the Bowers Landfill RI/FS are available at this location. The information repository also contains reports prepared by U.S. EPA, such as the Endangerment Assessment Report and Proposed Plan for Bowers Landfill.

On September 14, 1988, U.S. EPA held a formal public meeting to present the results of both the Remedial Investigation and Endangerment Assessment Reports. This meeting was held at the Circleville High School Cafeteria, 380 Clark Drive, Circleville, Ohio.

Finally, U.S. EPA notified the local community, by way of the Proposed Plan, of the preliminary selection of a remedial alternative for Bowers Landfill. To encourage public participation in the selection of a remedial alternative, U.S. EPA scheduled a public comment period from February 14 to March 16, 1989. Additionally, U.S. EPA held a public meeting on February 28, 1989, to discuss the preferred remedial alternative, other alternatives evaluated in the FS, and any other documents previously released to the public. A transcript of this meeting is included as part of the Administrative Record for Bowers Landfill. U.S. EPA's responses to comments received during this public meeting and to written comments received during the public comment period are included in the Responsiveness Summary.

4.0 SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION

The selected remedy for Bowers Landfill was developed by combining aspects of source control, site access restrictions, drainage improvements, and long-term monitoring. In summary, the selected remedy will include removing surface debris and vegetation from the landfill, installing a 4-foot-thick clay and soil cap on the landfill top and side slopes, instituting erosion control and drainage improvements, fencing the site perimeter and restricting site use, and conducting long-term ground-water monitoring. The components of the selected remedy are described in greater detail in Section 10.0.

The principal threats that the landfill poses are exposure to ground water immediately downgradient of the site and exposure to contaminated soils on or near the landfill. The selected remedy will address these threats by capping contaminated soils, limiting access to the landfill area, and restricting future ground-water use between the landfill and the Scioto River. Because wastes will remain on-site, the selected remedy will provide for long-term monitoring and corrective action measures should monitoring indicate increased contamination or threats. Also, as required by Section 121(c) of CERCLA, the site will be reevaluated each 5 years to determine whether the selected remedy is effective.

5.0 SITE CHARACTERISTICS

The remedial investigation (RI), consisting of on-site scientific studies and laboratory analyses to determine the nature and extent of contamination at the site, has been completed. The first phase investigation took place from July 1986 to May 1987. A second phase investigation was conducted in February and March 1988. During the RI, samples were taken of ground water, surface water, sediment, and soil. The results of the RI are summarized below.

5.1 Ground Water

The Bowers Landfill site is underlain by 40 to 100 feet of glacial deposits, which overlie shale bedrock. These glacial deposits are part of an extensive aquifer system that underlies the Scioto River floodplain. In the site area, glacial deposits thicken to the south and west of the site, and are thinnest at the northeast portion of the landfill. The glacial deposits include two water-bearing zones -- (1) a brown sand and gravel deposit that lies approximately 10 feet below the land surface and (2) a gray sand deposit with lesser amounts of gravel that lies just above the bedrock. These two zones are considered the upper and lower aquifers over most of the site and are separated by a low-permeability silt-clay deposit. However, the two aquifers may be hydraulically connected at some site locations. The bedrock below the glacial deposits is considered an aquiclude and is not used locally for water supply. Figure 2 illustrates an east-to-west geologic-cross section of the site area.

Dames and Moore installed 20 ground-water monitoring wells at the site. These included 10 shallow wells, 5 intermediate wells, and 5 deep wells (Figure 3). Shallow wells were screened at the water table near the top of the upper aquifer. Intermediate wells were screened within the lower portion of the upper aquifer. Deep wells were screened within the lower aquifer. A comparison of ground-water levels for each series of wells (shallow, intermediate, and deep) indicated that ground water near the site is moving west or southwest.

FIGURE 2

GEOLOGIC CROSS-SECTION OF THE SITE AREA

BOWERS LANDFILL - CIRCLEVILLE, OHIO

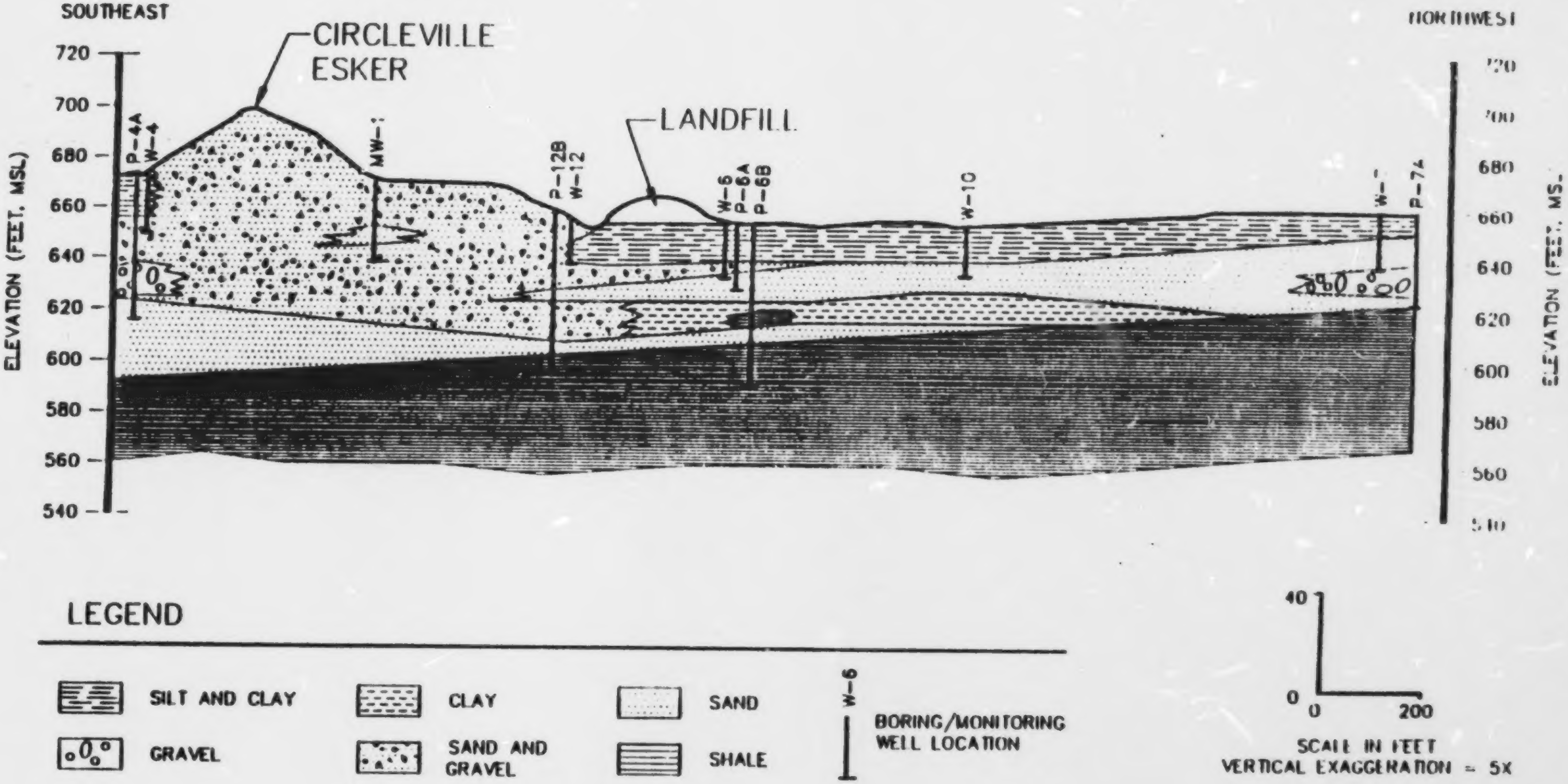
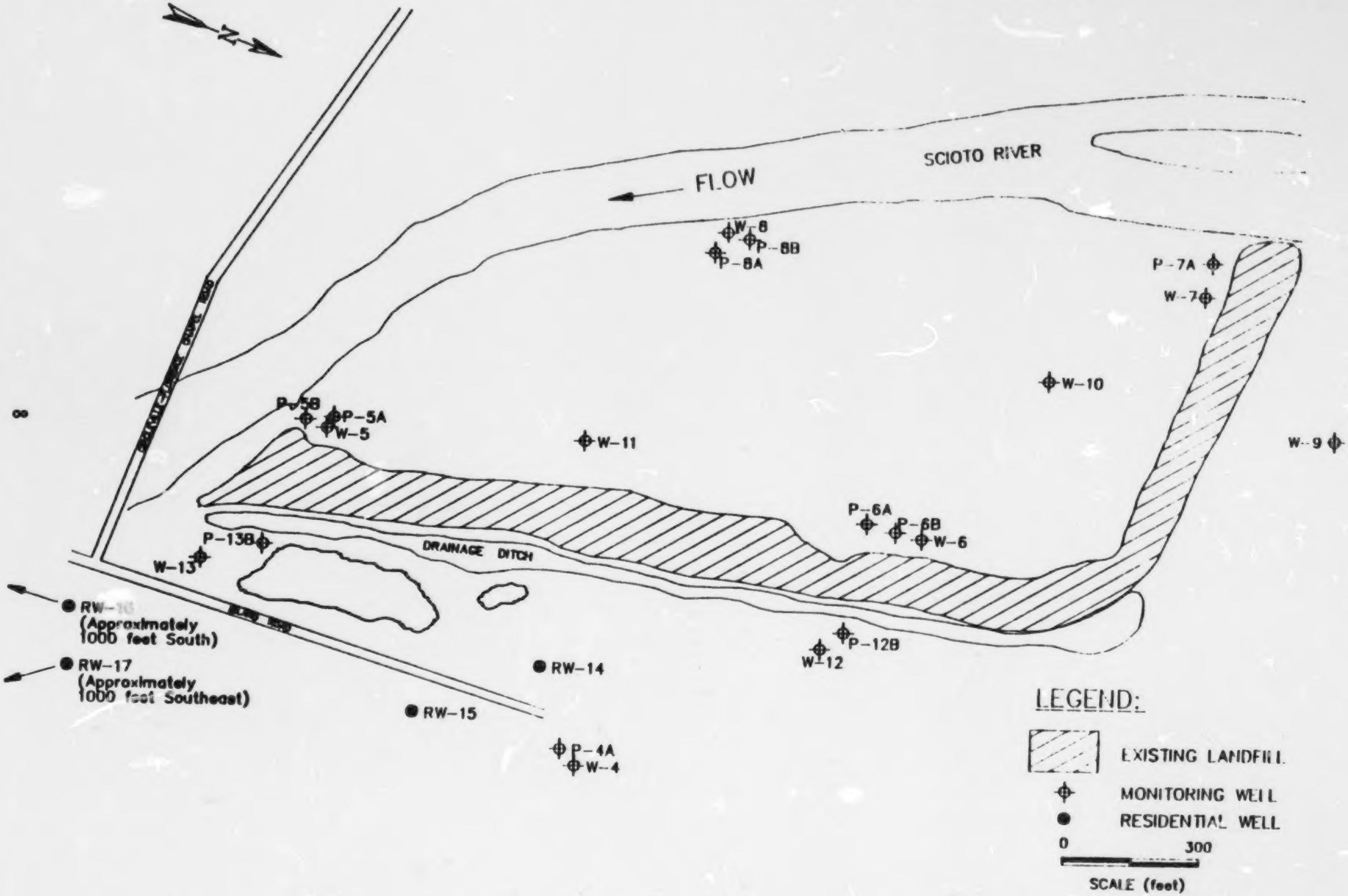

SOUTHEAST
NORTHWEST
CIRCLEVILLE ESKER
LANDFILL
ELEVATION (FEET, MSL)
720
700
680
660
640
620
600
580
560
540
P-4A
W-4
MW-1
P-12B
W-12
W-6
P-6A
P-6B
W-10
W-7
P-7A
LEGEND
SILT AND CLAY
GRAVEL
CLAY
SAND AND GRAVEL
SAND
SHALE
W-6
BORING/MONITORING WELL LOCATION
40
0
0
200
SCALE IN FEET
VERTICAL EXAGGERATION = 5X

FIGURE 3. – LOCATIONS OF WELLS SAMPLED


N
SCIOTO RIVER
FLOW
W-8
P-8B
P-8A
P-7A
W-7
W-10
P-5B
P-5A
W-5
W-11
W-9
P-6A
P-6B
W-6
P-13B
W-13
DRAINAGE DITCH
RW-16
(Approximately
1000 feet South)
RW-17
(Approximately
1000 feet Southeast)
RW-14
RW-15
P-4A
W-4
P-12B
W-12
LEGEND:
EXISTING LANDFILL
MONITORING WELL
RESIDENTIAL WELL
0
300
SCALE (feet)

Ground-water samples were collected from 18 monitoring wells in February 1987 and May 1987 (Figure 3). Samples were also collected from four residential wells in February 1987. Two additional monitoring wells were installed in February 1988. These wells and three of the original 18 wells were sampled in March 1988. All samples were analyzed for VOCs, semivolatile organic compounds (SVOC), pesticides, polychlorinated biphenyls (PCB), metals, and cyanide. Samples collected in February and May 1987 were also analyzed for dioxin.

VOCs including acetone, methylene chloride, tetrachloroethene, and benzene were detected at low concentrations in some ground-water samples taken from monitoring wells at or near the site. In all, 9 of the 20 monitoring wells contained VOCs in at least one sample. Most of these positive results were due to acetone and methylene chloride, common laboratory contaminants. Benzene and tetrachloroethene were found in one well each. Benzene was found in well P-6B, downgradient of the landfill, in two of three sampling rounds. The highest concentration detected was 6 μg/L, slightly above the U.S. EPA drinking water standard of 5 μg/L. Tetrachloroethene was found in upgradient well W-12 both times this well was sampled. The maximum concentration detected was 5.3 μg/L.

Bis(2-ethylhexyl)phthalate, a SVOC, was detected in several ground-water samples. Three other SVOCs, di-n-butyl phthalate, 2-methylnaphthalene, and n-nitrosodiphenylamine, were found in one sample each. All of these chemicals except one (bis(2-ethylhexyl)phthalate at 21 μg/L in well P-7A) were identified at levels below U.S. EPA-specified detection limits. No SVOCs were detected in residential well samples.

A number of metals were also detected in ground-water monitoring and residential wells. All levels except those for barium were below U.S. EPA drinking water standards. Barium was detected above drinking water standards in all three samples collected from well P-5B. This well is screened in the lower aquifer near the south end of the site. Since barium was detected in all ground-water samples, including samples from residential wells, some portion of the barium found in well P-5B may be due to natural sources.

Residential wells do not appear to be affected by releases from the site. Methylene chloride, a common laboratory contaminant, was the only organic compound found in residential wells, and no metals were detected above drinking water standards. In addition, sampling results from the Circleville municipal well field, located 1-1/2 miles south of the landfill, show that the well field has not been affected by Bowers Landfill. Ground-water contamination resulting from the landfill appears to be confined to the area between the landfill and the Scioto River. The Scioto River is the likely discharge point of these contaminated ground waters. Thus, the impact of contaminated ground water appears limited.

5.2 Surface Water and Sediment

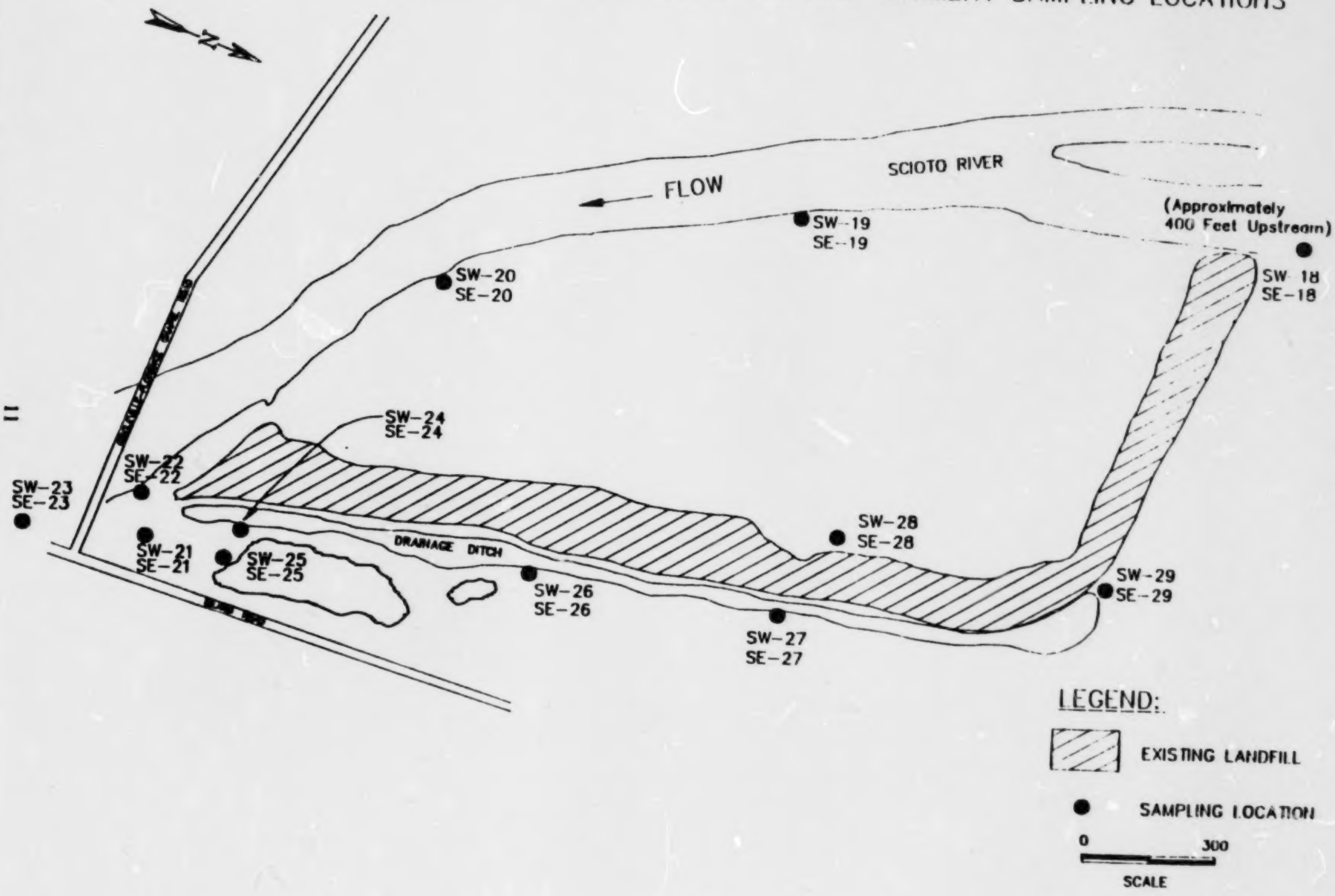
Surface water and sediment samples were collected from 12 locations in the Scioto River and nearby surface water bodies. These samples were analyzed for VOCs, SVOCs, pesticides, PCBs, metals, cyanide, and dioxin. Samples were collected from all locations shown on Figure 4 during two sampling events.

Methylene chloride (5 samples), tetrachloroethene (3 samples), and 1,2-dichloroethane (2 samples) were found at low levels (up to 5.7 μg/L) in the river downstream of the landfill or in drainage ditches near the landfill. However, methylene chloride and tetrachloroethene were found at similar concentrations in upstream background samples. Aroclor-1260, a PCB, was found in two surface water samples collected from the Scioto River, one upstream and one downstream. Several metals were also detected in surface water samples. However, many of these metals occur naturally. Aluminum, barium, chromium, and mercury were found above upstream background concentrations in at least one sample each.

Several SVOCs were detected in sediment samples collected from the Scioto River and drainage ditches near the site. These include polynuclear aromatic hydrocarbons (PAH), phthalate compounds, 4-methylphenol, chlordane, and PCBs. PAHs and phthalates were also found at similar concentrations in upstream background samples. PCBs were detected at three locations in drainage ditches adjacent to the landfill (SE-27, SE-28, and SE-29) and appear to have originated from the site. The maximum concentration detected was 2,300 μg/kg. Chlordane, a pesticide, was found at concentrations ranging from 120 to 200 μg/kg in three locations. All three locations (SE-20, SE-21, and SE-22) were in or adjacent to the Scioto River, near the southern end of the landfill. While chlordane may be associated with landfilling, the occurrence of this pesticide could also be due to agricultural activities in the field west of the landfill. The occurrence of 4-methylphenol appears to be concentrated near the southern end of the landfill and the drainage ditch to the east. This SVOC was found in seven sampling locations, with a maximum concentration of 8,600 μg/kg at SE-22.

Several metals were found above background levels in sediment samples. These include aluminum, barium, cadmium, chromium, lead, mercury, vanadium, and zinc. However, these metals were found at elevated levels in only a few (no more than four) sampling locations at various locations on the landfill.

FIGURE 4. -- SURFACE WATER AND SEDIMENT SAMPLING LOCATIONS


N
FLOW
SCIOTO RIVER
(Approximately 400 Feet Upstream)
SW-18 SE-18
SW-19 SE-19
SW-20 SE-20
SW-24 SE-24
SW-22 SE-22
SW-23 SE-23
SW-21 SE-21
SW-25 SE-25
DRAINAGE DITCH
SW-26 SE-26
SW-27 SE-27
SW-28 SE-28
SW-29 SE-29
LEGEND:
EXISTING LANDFILL
SAMPLING LOCATION
0
300
SCALE

5.3 Soils

Surface soil samples were collected from 22 locations in September 1986. These samples were analyzed for VOCs, SVOCs, pesticides, PCBs, metals, cyanide, and dioxin. Additional soilsamples were collected in March 1988 as part of the second phase of the RI. Ten locations were sampled, including seven new locations. This second round of soil samples was analyzed only for arsenic and lead. In all, 29 locations were sampled, including 7 off-site locations. Figure 5 shows the soil sampling locations.

Three pesticides (ß-BHC, dieldrin, and chlordane) were found in soil samples. The pesticides were found at two locations in the field west of the landfill (SO-7 and SO-11), one location at the western end of the landfill (SO-35), and one location south of the landfill (SO-44). The maximum concentration detected was 210 μg/kg of chlordane at locations SO-35 and SO-44. The presence of these pesticides in the field west of the landfill could be due to past agricultural activities.

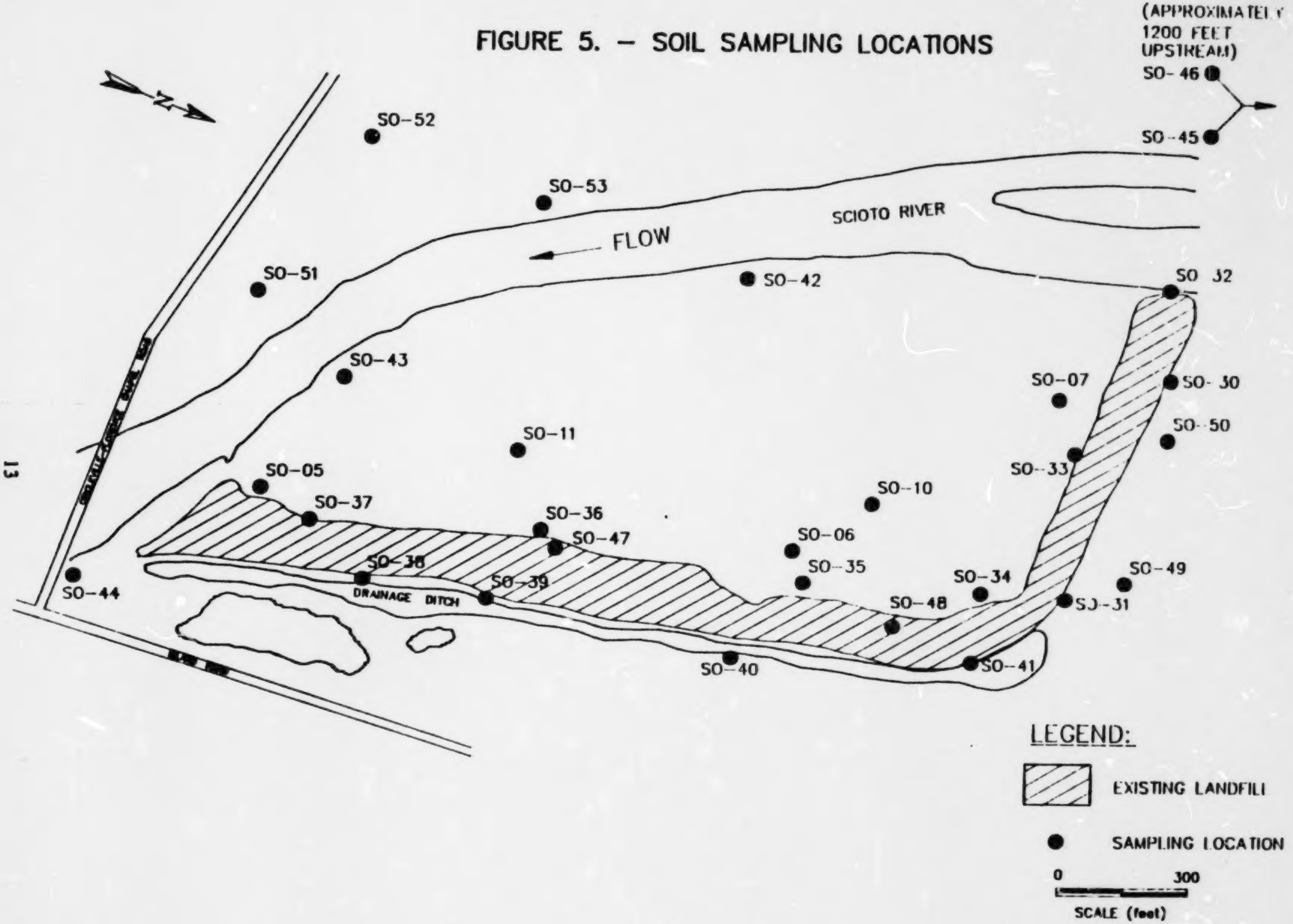
Three PCB compounds (Aroclors 1242, 1248, and 1254) were detected in soil samples at nine locations. Eight of these locations are on or directly adjacent to the landfill, with six of the locations clustered near the northeast corner of the landfill. Thus, the presence of PCBs appears to be related to landfilling activities. The highest concentration, 3,600 μg/kg, was found at location SO-34.

In the first round of soil samples, several metals were found near the landfill at concentrations higher than off-site background levels. These include aluminum, arsenic, cobalt, lead, vanadium, and zinc. A second round of soil samples was collected and analyzed for arsenic and lead to determine whether these metals might be related to landfilling activities. The combined results from the two rounds indicated that soil arsenic levels were similar for samples collected on the landfill, in the agricultural fields directly west and north of the landfill, and from locations west of the Scioto River. However, the results for lead indicated that soil samples collected from the landfill had slightly higher concentrations. The maximum lead concentration, 179 mg/kg, was found at location SO-35.

5.4 Air

No quantitative air samples were collected during the RI at Bowers Landfill. Thus, the extent of air contamination at the site is not known. However, air monitoring was conducted during the RI for VOCs, radiation, and combustible gases. On-site concentrations were not elevated above background levels.

FIGURE 5. – SOIL SAMPLING LOCATIONS


(APPROXIMATELY 1200 FEET UPSTREAM)
SO-46
SO-45
N
SO-52
SO-53
SCIOTO RIVER
FLOW
SO-51
SO-42
SO-32
SO-43
SO-07
SO-30
SO-50
SO-11
SO-33
SO-05
SO-10
SO-37
SO-36
SO-47
SO-06
SO-35
SO-38
SO-39
SO-34
SO-49
DRAINAGE DITCH
SO-48
SO-31
SO-44
SO-40
SO-41
LEGEND:
EXISTING LANDFILL
SAMPLING LOCATION
0
300
SCALE (feet)

Bowers Landfill has a low potential for VOC emissions to air because very few VOCs were found in surface soils, surface water, or sediments. Other contaminants found in surface soils, such as PCBs, PAHs, and metals, could become airborne if dust is released from the landfill surface. However, the site is currently covered with vegetation and has very little exposed soil.

6.0 SUMMARY OF SITE RISKS

PRC Environmental Management, Inc., under contract to U.S. EPA (No. 68-01-7331), conducted an endangerment assessment (EA) for Bowers Landfill. This section summarizes the findings of the EA and characterizes site risks.

6.1 Indicator Chemicals

The EA used standard U.S. EPA procedures, as outlined in the Superfund Public Health Evaluation Manual, to identify indicator chemicals for Bowers Landfill. The EA focused on potential exposure to and risks from these chemicals. The indicator chemicals were generally those contaminants that exhibited the most toxic properties, were found in several environmental media, or were detected at the greatest frequency.

The indicator chemicals included three metals (barium, lead, and mercury); two VOCs (benzene and tetrachloroethene); two SVOCs (4-methylphenol and PAHs); PCBs; and one pesticide (chlordane). The EA evaluated PAHs as a class of chemicals, focusing on those PAHs that are known or suspected carcinogens. Tables 1 through 4 identify the detection frequencies and concentrations (mean and maximum) of indicator chemicals in samples collected during the RI. Results are organized by environmental medium (ground water, surface water, sediments, and soil).

6.2 Exposure Assessment and Risk Characterization

The indicator chemicals identified in various environmental media during the RI were evaluated to determine the level of risk they pose to public health and the environment. The EA identified 10 potential exposure scenarios for contaminants at or released from Bowers Landfill. Potential risks for each scenario were characterized for human and animal populations that could become exposed.

The EA concluded that potential risks existed under 5 of the 10 scenarios evaluated. These exposure scenarios include ingestion of ground water; ingestion of surface water; ingestion

TABLE 1

DETECTION FREQUENCIES AND CONCENTRATIONS OF INDICATOR CHEMICALS IN GROUND WATER NEAR BOWERS LANDFILL.

	Upgradient Wells				Downgradient Wells				Residential Wells			
Compound	Frequency of Detection[1]	Adjusted Frequency of Detection[2]	Geometric Mean (ug/L)	Maximum Concentration (ug/L)	Frequency of Detection	Adjusted Frequency of Detection	Geometric Mean (ug/L)	Maximum Concentration (ug/L)	Frequency of Detection	Adjusted Frequency of Detection	Geometric Mean (ug/L)	Maximum Concentration (ug/L)
Barium	16/16	16/16	185	368	37/37	37/37	330	2070	5/5	5/5	112	[130]
Lead	2/16	1/15	1.2	7.0	8/37	1/27	1.2	6.9	0/5	—	—	—
Mercury	2/16	0/16	—	—	0/37	—	—	—	0/5	—	—	—
Benzene	0/16	—	—	—	3/37	3/37	0.70	6.0	0/5	—	—	—
Tetrachloroethene	3/16	3/16	0.89	5.3	0/37	—	—	—	0/5	—	—	—
Chlordane	0/16	—	—	—	0/37	—	—	—	0/5	—	—	—
PCBs	0/16	—	—	—	0/37	—	—	—	0/5	—	—	—
4-Methylphenol	0/16	—	—	—	0/37	—	—	—	0/5	—	—	—
PAHs	0/16	—	—	—	0/37	—	—	—	0/5	—	—	—

Notes:

[ ] Estimated value; compound found at concentration below U.S. EPA required detection limit

— Not calculated

[1] Frequency of detection is defined as a/b, where –
a = number of times a compound was detected
b = total number of samples
Sample results which were identified by the laboratory as due to blank contamination are not counted in either a or b.

[2] Adjusted frequency of detection omits samples from which results were questionable due to QA/QC problems; only samples included in this column were used to determine geometric mean and maximum concentrations.

TABLE 2

DETECTION FREQUENCIES AND CONCENTRATIONS OF INDICATOR CHEMICALS IN SURFACE WATER NEAR BOWERS LANDFILL

	Scioto River - Upstream				Scioto River - Downstream				Drainage Ditches			
Compound	Frequency of Detection[1]	Adjusted Frequency of Detection[2]	Geometric Mean (ug/L)	Maximum Concentration (ug/L)	Frequency of Detection	Adjusted Frequency of Detection	Geometric Mean (ug/L)	Maximum Concentration (ug/L)	Frequency of Detection	Adjusted Frequency of Detection	Geometric Mean (ug/L)	Maximum Concentration (ug/L)
Barium	2/2	2/2	56	[60]	9/9	9/9	54	[60]	19/19	19/19	101	[199]
Lead	1/2	0/1	—	—	4/9	0/5	—	—	4/19	1/15	1.3	8.6
Mercury	0/2	—	—	—	2/9	1/3	0.13	0.20	1/19	1/5	0.12	0.27
Benzene	0/2	—	—	—	0/9	—	—	—	0/19	—	—	—
Tetrachloroethene	1/2	1/2	0.74	1.1 J	2/9	2/9	0.59	1.1 J	0/19	—	—	—
Chlordane	0/2	—	—	—	0/9	—	—	—	0/19	—	—	—
PCBs	1/2	1/2	0.77	1.2	0/9	—	—	—	1/19	1/19	0.55	2.6
4-Methylphenol	0/2	—	—	—	0/9	—	—	—	0/19	—	—	—
PAHs	0/2	—	—	—	0/9	—	—	—	0/19	—	—	—

Notes:

[ ], J Estimated value; compound found at concentration below U.S. EPA required detection limit

— Not calculated

1 Frequency of detection is defined as a/b, where –
  a = number of times a compound was detected
  b = total number of samples
Sample results which were identified by the laboratory as due to blank contamination are not counted in either a or b.

2 Adjusted frequency of detection omits samples from which results were questionable due to QA/QC problems; only samples included in this column were used to determine geometric mean and maximum concentrations.

TABLE 3

DETECTION FREQUENCIES AND CONCENTRATIONS OF INDICATOR CHEMICALS IN SEDIMENTS NEAR BOWERS LANDFILL

	Scioto River – Upstream				Scioto River – Downstream				Drainage Ditches			
Compound	Frequency of Detection[1]	Adjusted Frequency of Detection[2]	Geometric Mean (mg/kg)	Maximum Concentration (mg/kg)	Frequency of Detection	Adjusted Frequency of Detection	Geometric Mean (mg/kg)	Maximum Concentration (mg/kg)	Frequency of Detection	Adjusted Frequency of Detection	Geometric Mean (mg/kg)	Maximum Concentration (mg/kg)
Barium	2/2	2/2	113	118	9/9	9/9	106	312	19/19	19/19	128	227 E
Lead	2/2	2/2	31	38	9/9	8/8	34	39	19/19	15/15	39	104
Mercury	2/2	1/1	—	0.40	9/9	4/4	0.48	0.59	10/19	6/15	0.14	1.4
Chlordane	0/2	—	—	—	2/9	2/9	0.067	0.200	2/19	2/19	0.055	0.140
PCBs	0/2	—	—	—	0/9	—	—	—	5/19	5/19	0.105	2.300
Benzene	0/2	—	—	—	0/9	—	—	—	0/19	—	—	—
Tetrachloroethene	0/2	—	—	—	0/9	—	—	—	0/19	—	—	—
4-Methylphenol	0/2	—	—	—	2/9	2/9	0.069	8.600	7/19	7/19	0.091	8.100
PAHs												
Benzo(a)anthracene	2/2	2/2	0.415	0.420 J	8/9	8/9	0.256	3.600	11/19	11/19	0.072	0.400 J
Benzo(a)pyrene	2/2	2/2	0.408	0.450 J	9/9	9/9	0.217	0.370 J	11/19	11/19	0.077	0.400 J
Benzo(b)fluoranthene	2/2	2/2	0.900	0.910	9/9	9/9	0.451	0.750	13/19	13/19	0.137	1.000
Chrysene	2/2	2/2	0.519	0.550	9/9	9/9	0.287	0.480	12/19	12/19	0.095	0.710 J
Dibenzo(a,h) anthracene	2/2	2/2	0.116	0.160 J	1/9	1/9	0.030	0.130 J	1/19	1/19	0.027	0.092 J
Indeno(1,2,3-cd) pyrene	2/2	2/2	0.275 J	0.290 J	5/9	5/9	0.064	0.250 J	8/19	8/19	0.049	0.270 J

Notes:

J Estimated value; compound found at concentration below U.S. EPA required detection limit

E Concentration is estimated due to presence of interference during analysis

— Not calculated

1 Frequency of detection is defined as a/b, where –
a = number of times a compound was detected
b = total number of samples
Sample results which were identified by the laboratory as due to blank contamination are not counted in either a or b.

2 Adjusted frequency of detection omits samples from which results were questionable due to QA/QC problems; only samples included in this column were used to determine geometric mean and maximum concentrations.

TABLE 4

DETECTION FREQUENCIES AND CONCENTRATIONS OF INDICATOR CHEMICALS IN SOILS NEAR BOWERS LANDFILL

	Background Locations				Locations On or Adjacent to the Landfill				Agricultural Areas			
Compound	Frequency of Detection[1]	Adjusted Frequency of Detection[2]	Geometric Mean (mg/kg)	Maximum Concentration (mg/kg)	Frequency of Detection	Adjusted Frequency of Detection	Geometric Mean (mg/kg)	Maximum Concentration (mg/kg)	Frequency of Detection	Adjusted Frequency of Detection	Geometric Mean (mg/kg)	Maximum Concentration (mg/kg)
Barium	2/2	2/2	152	156	15/15	15/15	189	287	7/7	7/7	121	198
Lead	5/5	5/5	47	74 E	21/21	21/21	78	179	11/11	11/11	59	102 E
Mercury	2/2	0/2	—	—	15/15	15/15	0.27	0.43	7/7	2/2	0.48	0.58
Chlordane	0/2	—	—	—	2/15	2/15	0.015	0.210	1/7	1/7	0.014	0.110
PCBs	0/2	—	—	—	9/15	9/15	0.238	3.600	1/7	1/7	0.063	0.240
Benzene	0/2	—	—	—	0/15	—	—	—	0/7	—	—	—
Tetrachloroethene	0/2	—	—	—	0/15	—	—	—	0/7	—	—	—
4-Methylphenol	0/2	—	—	—	0/15	—	—	—	0/7	—	—	—
PAHs												
Benzo(a)anthracene	2/2	2/2	0.130	0.140 J	14/15	14/15	0.116	4.300	6/7	6/7	0.081	0.210 J
Benzo(a)pyrene	2/2	2/2	0.134	0.150 J	12/15	12/15	0.115	4.300	5/7	5/7	0.088	0.230 J
Benzo(b)fluoranthene	2/2	2/2	0.265	0.280 J	11/14	11/14	0.178	8.600	7/7	7/7	0.204	0.510
Chrysene	2/2	2/2	0.160	0.160 J	14/15	14/15	0.169	5.200	7/7	7/7	0.136	0.240 J
Dibenzo(a,h) anthracene	0/2	—	—	—	1/15	1/15	0.026	0.960 J	0/7	—	—	—
Indeno(1,2,3-cd) pyrene	1/2	1/2	0.047	0.110 J	11/15	11/15	0.073	2.600	4/7	4/7	0.054	0.160 J

Notes:

J Estimated value; compound found at concentration below U.S. EPA required detection limit

E Concentration is estimated due to presence of interference during analysis

— Not calculated

1 Frequency of detection is defined as a/b, where –
  a = number of times a compound was detected
  b = total number of samples
  Sample results which were identified by the laboratory as due to blank contamination are not counted in either a or b.

2 Adjusted frequency of detection omits samples from which results were questionable due to QA/QC problems; only samples included in this column were used to determine geometric mean and maximum concentrations.

of aquatic animals; ingestion of soils; and direct contact with surface water. The first four scenarios apply to humans living near Bowers Landfill while the fifth scenario applies to aquatic species living in the Scioto River near the landfill. The potential risks associated with each scenario are summarized in Table 5 and discussed below.

6.2.1 Ingestion of Ground Water

The EA identified a potential risk from drinking ground water immediately downgradient of the landfill. The area included in this scenario is the field between the landfill and the Scioto River. Ground water in this area contains barium (a noncarcinogen) and benzene (a carcinogen) at concentrations above U.S. EPA Maximum Contaminant Levels (MCL) for drinking water. However, each contaminant exceeded the standard in only one well; samples from all other wells contained barium and benzene concentrations well below MCLs.

The EA assumed that a 70-kg adult would drink 2 liters of ground water per day over a 70-year lifetime. Probable case doses from this exposure were calculated using average barium and benzene concentrations in downgradient ground water (Table 1). Worst case doses were calculated from maximum concentrations. The EA then used these doses to estimate potential risks. Noncarcinogenic risks were estimated by calculating a Hazard Index (HI), the ratio of the exposure dose to the acceptable chronic intake for barium. This ratio was 1.04 for the maximum barium concentration, indicating that the estimated dose exceeded the acceptable dose. Probable case risks were much lower, with the HI equal to 0.17. Carcinogenic risks for benzene were estimated by multiplying the exposure dose by the carcinogenic potency factor (CPF). For worst case exposure conditions, this risk was 9×10^{-6}; the probable case risk was 1×10^{-6}.

Although these risks are significant, exposure is unlikely to occur. Ground water downgradient of the site, between the landfill and the Scioto River, is not currently used as a drinking water source. Further, this area is often flooded and is not a likely location for future drinking water wells.

In addition to these potential future risks, the EA looked at risks to current users of ground water near Bowers Landfill. All existing residential wells near the site are upgradient. Four residential wells were sampled during the RI and showed no effects of the landfill on water quality (Table 1). The City of Circleville water supply is also of concern. Circleville obtains its municipal water supply from a wellfield approximately 1½ miles south of the site. However, the RI study of the area south of the landfill was limited. The EA considered the possibility of regional ground-water flow to the south, along the Scioto River basin. To investigate this possibility, the EA reviewed water quality sampling data submitted by the city to the Ohio

TABLE 5

SUMMARY OF POTENTIALLY SIGNIFICANT RISKS IDENTIFIED FOR BOWERS LANDFILL

Exposure Route	CA/NCA[1]	Contaminants	Risk Assessment	Comments
1. Ingestion of Ground Water	NCA	Barium	Hazard Index[2] = 1.04	While based on the maximum barium concentration, the hazard index only slightly exceeds unity. Therefore, the actual noncarcinogenic risk via this scenario is probably very small.
	CA	Benzene	Incremental Carcinogenic risk = 9×10^{-6} (worst case), 1×10^{-6} (probable case)	The incremental carcinogenic risks for benzene are within the target range of 10^{-4} to 10^{-7} (see footnote No. 3).
2. Ingestion of Surface Water	CA	PCBs	Maximum PCB concentration in the drainage ditches (2.6 ug/L) exceeds the ambient water quality criterion (AWQC) for consumption of drinking water. This AWQC (0.013 ug/L) corresponds to a 10^{-6} cancer risk.	The AWQC for PCBs assumes lifetime exposure while this scenario assumes infrequent incidental ingestion; therefore, this comparison overestimates the actual risk.
3. Ingestion of Aquatic Animals	NCA	Mercury	The maximum mercury concentration (0.2 ug/L) exceeds the AWQC based on ingestion of aquatic animals (0.146 ug/L).	Tissue samples have not been taken to verify the extent of this exposure. However, average mercury concentrations were below the AWQC and mercury was found in only one surface water sample from the Scioto River. Thus, this risk is limited.
4. Ingestion of Soils	NCA	Lead	Hazard Index = 3.20	This hazard index may overestimate the actual risk because it assumes both the maximum lead concentration and a worst case soil ingestion rate. Further, lead levels in on-site soils are below Centers for Disease Control (CDC) guidelines for residential areas.
	CA	Total PAHs[4]	Incremental Carcinogenic Risk = 2×10^{-6}	These two risks may overestimate the actual risk because they are based on maximum concentrations and a worst case soil ingestion rate. See also Footnote No. 3.
		PCBs	Incremental Carcinogenic Risk = 7×10^{-7}	
5. Direct Contact with Surface Water by Aquatic Animals	NCA	Mercury	Maximum mercury concentration (0.2 ug/L) exceeds the 4-day AWQC for protection of aquatic life (0.012 ug/L).	Actual risk may be negligible based on average mercury concentrations. Further mercury was found in only one surface water sample from the Scioto River.

Notes:

[1] CA = Carcinogenic
NCA = Noncarcinogenic

[2] The hazard index (HI) is calculated as the ratio of exposure dose to acceptable dose; an HI > 1 indicates a potentially significant risk.

[3] U.S. EPA guidance describes a target carcinogenic risk range of 10^{-4} to 10^{-7}. Risks greater than 10^{-4} are considered "significant", while risks $< 10^{-7}$ are considered insignificant. Risks between 10^{-4} and 10^{-7} are within the target range; their significance will, in general, reflect site specific factors.

[4] Calculations included the following carcinogenic PAHs: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-c,d)pyrene. The incremental carcinogenic risk for total PAHs was calculated by multiplying the maximum concentration of each PAH other than benzo(a)pyrene by a relative potency factor to benzo(a)pyrene. The adjusted concentrations were then summed along with the concentration of benzo(a)pyrene itself and, finally, multiplied by the carcinogenic potency factor for benzo(a)pyrene. Details of this calculation process are described in the Endangerment Assessment Report for Bowers Landfill.

Department of Health over an 8-year period from 1980 to 1987. Based on this review, there is no evidence that Bowers Landfill has affected Circleville's water supply. Table 6 summarizes the data reviewed.

6.2.2 Ingestion of Surface Water

The EA identified a potential risk from ingestion of contaminated surface water. This exposure scenario was based on accidental ingestion of surface water near Bowers Landfill. Access to the landfill is not restricted, and exposure could occur if people waded in or fell into drainage ditches or the Scioto River near the landfill. The EA evaluated potential risks by comparing maximum surface water concentrations with U.S. EPA guidelines for acute or short-term exposure. Of the indicator chemicals found in surface water, only PCBs exceeded a guideline. The maximum PCB concentration of 2.6 μg/L (Table 2) was higher than the long-term ambient water quality criterion (AWQC) of 0.0126 μg/L. However, the AWQC is based on lifetime consumption of 2 liters of PCB-contaminated water per day. Thus, the AWQC is not directly applicable to the infrequent exposure and small amounts of water ingested under this exposure scenario. The EA concluded that risks from ingesting contaminated surface water were limited.

6.2.3 Ingestion of Aquatic Animals

The EA identified a potential risk from ingestion of aquatic animals from near Bowers Landfill. This exposure scenario was based on ingestion of fish and other aquatic species taken from the Scioto River. The EA compared downstream surface water concentrations (Table 2) to AWQCs for ingestion of aquatic species. Only one indicator chemical, mercury, was found above background (upstream) concentrations in the Scioto River near Bower Landfill. The maximum mercury concentration in river water (0.2 μg/L) slightly exceeded the AWQC (0.146 μg/L); the average mercury concentration was below the AWQC. This AWQC was developed by U.S. EPA to protect persons who consume 6.5 grams per day of aquatic organisms taken from mercury-contaminated water. The EA characterized risks from this scenario as limited for two reasons. First, mercury was found in only one sample from the Scioto River. Second, the mercury concentration in this sample only slightly exceeded the AWQC.

6.2.4 Ingestion of Soils

The EA identified a potential risk from ingesting contaminated soils at or near Bowers Landfill. Access to the site is not restricted, so small children could reach the site and ingest contaminated soil. The EA assumed that a 20-kg child would eat contaminated soil 10 days per

TABLE 6

SUMMARY OF WATER QUALITY SAMPLING RESULTS FOR THE CITY OF CIRCLEVILLE DEPARTMENT OF PUBLIC UTILITIES, WATER SUPPLY SYSTEM, 1980-1987

(CONCENTRATIONS OF INDICATOR CHEMICALS IN ug/L)

Location:	114 W. Franklin	#1 Well	#2 Well	#3 Well	Wells 1, 2 and 3	663 Hassle Rd.
Dates:	08/24/87	06/19/86	06/19/86	06/19/86	12/05/85	04/27/83
Compound						
Barium	160	<300	<300	<300	<300	—
Lead	1	ND	<5	<5	<5	—
Mercury	<0.2	<0.5	<0.5	<0.5	<0.5	—
Chlordane	—	—	—	—	—	ND
PCBs	—	—	—	—	—	ND
Tetrachloroethene[b]	—	—	—	—	—	<0.5
PAHs	—	—	—	—	—	ND

Notes:

Compiled from results submitted to Ohio Department of Health, 1980-1987.

a Only the results for samples that were analyzed for at least 1 indicator chemical other than tetrachloroethene are presented; see footnote b.

b 34 additional samples within this time period were analyzed for tetrachloroethene; all the results were negative.

ND Compound was analyzed for but not detected.

— Compound was not measured.

year over a 3-year period, and that 50 percent of the contaminants in the soil would be absorbed by the body. Probable case doses from this exposure were calculated based on ingesting 0.1 g/day of soil containing average contaminant levels. Worst case doses were calculated based on ingesting 1.0 g/day of soil containing maximum contaminant levels. The EA calculated doses only for those indicator chemicals found at or adjacent to the landfill at concentrations higher than background. These chemicals included barium, lead, mercury, chlordane, PCBs, and PAHs (Table 4).

The EA used the resulting doses to estimate potential risks. Noncarcinogenic risks were estimated by calculating a Hazard Index (HI), the ratio of the exposure dose to the acceptable chronic intake. Under worst case conditions, the total HI was 3.48, indicating that the estimated dose for all noncarcinogenic indicator chemicals exceeded the acceptable dose. Most of the HI was attributable to lead (HI = 3.20). However, the highest measured lead concentration at the site (179 mg/kg) was well below Centers for Disease Control (CDC) guidelines for acceptable lead values in residential soils. These guidelines suggest that lead values between 500 and 1,000 mg/kg are unacceptable.

Cancer risks were estimated by multiplying the average lifetime exposure dose by the CPF. For worst case exposure conditions, the total cancer risk for all chemicals was 3×10^{-6}. Most of this risk was attributable to ingestion of PAHs (2×10^{-6}) and PCBs (7×10^{-7}), with only a small portion due to chlordane. The probable case cancer risk was 5×10^{-9}.

6.2.5 Direct Contact with Surface Water by Aquatic Animals

The EA also identified a potential risk to aquatic species living in the Scioto River. The EA evaluated risks from this exposure scenario by comparing river water concentrations to AWQCs for protection of aquatic life. Only one of the indicator chemicals, mercury, exceeded an AWQC. The maximum mercury concentration of 0.2 μg/L (Table 2) was higher than the 4-day (chronic) AWQC for aquatic species of 0.012 μg/L. This comparison most likely overstates potential risks, since mercury was found in only one sample collected from the Scioto River.

6.3 Potential Future Risks

Even though contaminant concentrations measured during the RI are relatively low, the landfill represents a potential threat of future contaminant releases that may endanger public health, welfare, and environment. A major remedial action objective for the site is to reduce this threat of future contaminant releases in addition to reducing current risks identified in the EA. Several factors contribute to the potential threat of future releases.

First, portions of the landfill are poorly covered. The lack of adequate cover is described in inspection reports by the Ohio Department of Health (February 1967) and the Pickaway County Health Department (April 1971). These inspections were conducted shortly before and shortly after waste disposal at Bowers Landfill ended. The lack of adequate cover was confirmed by more recent measurements made in November 1988 as part of the feasibility study. These measurements showed that wastes lie less than 1 foot below the cover in some areas of the landfill.

Second, although operating records for Bowers Landfill are poor, evidence exists that hazardous substances were placed in the landfill. Responses by DuPont and PPG to a 1978 House Subcommittee on Oversight and Investigation estimated that these companies sent approximately 6,000 and 1,700 tons of waste, respectively, to Bowers Landfill from 1965 to 1968. The wastes contained a variety of organic and inorganic chemicals. More recent 1988 responses by DuPont and PPG to information requested under Section 104(e) of CERCLA confirmed the disposal of hazardous substances at landfill. However, these responses contained little additional information on the amounts and types of wastes.

Finally, semiannual flooding of the Scioto River, usually in the spring and winter, also contributes to the threat of contaminant releases. Based on flood stage data for the river and the height of the landfill, portions of the landfill are overtopped by 2-year floods. The entire landfill would be covered by a 50-year flood. Flooding, in combination with trees growing on the landfill side slopes, presents two significant concerns. First, tree roots most likely penetrate directly into waste materials because of the shallow cover depth. These root systems provide a direct pathway for flood waters and precipitation to contact wastes and increase the likelihood of future ground-water contamination. Second, as the trees on the side slopes grow larger over time, they represent a threat to the stability of the side slopes. The combination of flood conditions, saturated soil, and high winds could cause larger trees to topple over, removing portions of the side slopes and exposing the wastes underneath.

7.0 DOCUMENTATION OF SIGNIFICANT CHANGES

This Record of Decision selects Alternative 4, as described in the Proposed Plan, as the preferred remedial alternative for Bowers Landfill. U.S. EPA has reviewed and responded to all comments received during the public comment period. Comments concerned Alternative 4 and other remedial alternatives. U.S. EPA has not made any significant changes to Alternative 4 based on public comments.

Alternative 4 includes the following components: long-term ground-water monitoring; site restrictions and a perimeter fence to limit site access and use; removal of debris and vegetation from the landfill surface; placement of a low-permeability clay cap (consisting of a clay layer, topsoil layer, and vegetation) over the entire landfill surface; drainage improvements to convey rainfall and flood waters away from the landfill; and erosion and flood control measures on areas of the landfill subject to damage from flood waters.

8.0 DESCRIPTION OF ALTERNATIVES

In response to the findings of the EA, the FS identified three potential risks that should be addressed by remedial response actions at Bowers Landfill. These risks are associated with ingestion of ground water immediately downgradient of the landfill, ingestion of soil from the landfill, and future releases from the landfill.

The FS identified technologies that could reduce risks for each of these media. These technologies were assembled into media-specific remedial alternatives. The FS then screened these media-specific alternatives based on effectiveness in reducing risks, implementability, and cost. Media-specific alternatives remaining after the screening process were assembled into nine site-wide remedial alternatives for detailed evaluation. This screening process was carried out according to procedures specified by U.S. EPA in CERCLA, the NCP, and U.S. EPA guidance documents including "Interim Guidance on Superfund Selection of Remedy" (OSWER Directive No. 9355.0-19, December 24, 1986) and "Draft Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (OSWER Directive No. 9355.3-01, March 1988).

The alternatives evaluated in detail include a no action alternative and eight alternatives that rely on containment of waste, with little or no treatment, to reduce site risks. The FS looked at alternatives involving treatment as a principal element to reduce the toxicity, mobility, or volume of site wastes. However, these alternatives were screened out, based on implementability, prior to the detailed analysis. The FS did not develop any remedial alternatives for source control that would eliminate the need for long-term management, including monitoring. Treatment alternatives of this type were not considered feasible because of the large volume and diverse nature of the waste materials in Bowers Landfill.

Each of the nine remedial alternatives evaluated in detail is described briefly below. The descriptions include containment components, institutional controls, estimated time for implementation, cost, overall protection, and compliance with applicable or relevant and appropriate requirements (ARARs). Section 9.0, which describes the comparative analysis of alternatives, includes additional detail on these subjects.

8.1 Alternative 1

Alternative 1 is the no action alternative. CERCLA requires that the no action alternative be considered at every site. Under this alternative, no further action would be taken at Bowers Landfill to reduce risks or to control the sources and migration of contaminants. The no action alternative will not modify the landfill in any way. Thus, it has no associated costs, and no time would be required to implement this alternative.

Capital Cost:	$ 0
Present Worth Operation & Maintenance (O & M) Costs:	$ 0
Total Costs:	$ 0
Time to Implement:	None

8.2 Alternative 2

Alternative 2 includes the following components:

- Ground-water monitoring
- Site restrictions

Under Alternative 2, a long-term monitoring program would be implemented to monitor contaminant concentrations and migration. This program would include the installation of additional monitoring wells south of Bowers Landfill (between the landfill and the Circleville municipal wellfield) and west of the landfill (between the landfill and the Scioto River). These new wells, existing monitoring wells, and possibly residential wells near the landfill would be sampled. The monitoring program would be designed to protect the Scioto River by sampling ground water that discharges to the river. Additionally, the program would sample water from the upper and lower aquifers that may flow under the river and join regional ground-water flow. At a minimum, the program would meet the substantive requirements for ground-water monitoring under the Resource Conservation and Recovery Act (RCRA) as described in 40 CFR 264, Subpart F.

The installation of three additional ground-water monitoring well clusters is necessary to develop a ground-water monitoring program that would adequately detect potential future releases of contaminants. These well clusters would consist of three wells; a shallow well that would be located in the upper portion of the saturated alluvial aquifer, an intermediate well that would be located between the water table and the bedrock, and a deep well that would be located just above the bedrock. Two of these well clusters would be installed west of the landfill. One cluster would be installed between well location 5 and well location 6 and the other between well W-10 and the bend of the landfill (see Figure 3). The third well cluster would be installed off-site between the landfill and the Circleville municipal wellfield. The installation of well clusters in addition to these may also be considered.

The monitoring wells would be sampled on a bimonthly basis for the first year and quarterly for years 2 through 4. During the first year, samples would be analyzed for the full Target Compound List (TCL). A reduced TCL may be considered after the first year. If the levels of contaminants in ground water did not increase over this time period, the sampling schedule would be reevaluated and a reduction in the frequency of sampling may be considered. A statistical test would be developed to determine when a significant increase in the level of contaminants had occurred.

Should a significant increase in the levels of contaminants occur, it would automatically trigger a RCRA corrective action. If the levels of contaminants in ground water exceeded MCLs, where available, or health-based levels, where MCLs are not available, resampling would occur within 14 days. (Health-based levels are concentrations corresponding to a cancer risk of 10^{-6} for carcinogenic contaminants and a hazard index (HI) greater than 1 for noncarcinogenic contaminants.) If the resampling verified that there had been a significant increase in the levels of contaminants, a corrective action program would be implemented. Corrective action may include such measures as the establishment of alternate concentration limits (ACLs), the collection and treatment of ground water, or the removal of the source of contamination.

The surface water in the drainage ditch to the east of the landfill would be sampled on a quarterly basis as part of the monitoring program. Monitoring would verify that discharges from the ditch are in compliance with Ohio Water Quality Standards, as described in the Ohio Administrative Code (OAC) 3745-01. A corrective action program would be implemented if contaminant levels in the ditch exceeded these standards.

Efforts will be made to procure deed restrictions prohibiting ground-water extraction in the field west of the landfill and restricting disturbance of the landfill surface. The viability of continued farming immediately west of the landfill would be evaluated, and, if shown to be necessary, efforts would be made to prohibit such farming by imposition of deed restrictions. A 6-foot fence would be placed around the landfill, the drainage ditch to the east, and the field to the west to limit site access.

Alternative 2 relies entirely on institutional controls and monitoring to reduce risk and does not include any containment or treatment components. Restricting ground-water use immediately downgradient of the site should be effective in eliminating risks from drinking this ground water. However, while fencing is identified as a means for limiting exposure, contaminated soils would remain uncovered. Exposure could still occur through dispersal of soil by erosion and by direct contact if persons enter the site despite the fence. Potential future risks, as described in Section 6.3, would not be reduced. Further, Alternative 2 does not meet State of Ohio closure requirements for solid waste landfills, which has been identified as an ARAR.

The costs of Alternative 2 and the estimated time for implementation are as follows:

Capital Cost:	$ 173,700
Present Worth O & M Costs:	$ 295,100
Total Costs:	$ 468,800
Time to Implement:	1 Month

8.3 Alternative 3

Alternative 3 includes the following components:

- Ground-water monitoring
- Site restrictions
- Management of surface debris
- Local repairs to existing landfill cover
- Erosion control and drainage improvements

Alternative 3 incorporates ground-water monitoring and site restrictions already described under Alternative 2. The additional components of this remedial alternative are discussed below.

The landfill area and its immediate vicinity would be cleared of surface debris. Nonhazardous debris would be disposed of at a nearby sanitary landfill, and any waste items determined to be hazardous would be disposed of at a suitable hazardous waste landfill.

After surface debris has been removed, areas showing signs of erosion would be identified. These areas would be cleared of vegetation and repaired with natural clay soil to be uniform with the surrounding surface. Drainage patterns on the landfill would be surveyed, and areas showing erosion would be repaired with fill. Areas prone to ponding would be regraded to provide a uniformly sloping surface that would drain water off the landfill. The existing vegetation cover of trees on the landfill would be maintained. As part of the maintenance program, the cover would be inspected on a regular basis for structural integrity and vegetative growth.

The drainage ditch east of the landfill would be improved to allow water to drain from the field north of the landfill through this ditch. The pipe that runs under the southern end of the landfill from this ditch would be replaced by a 36-inch-diameter corrugated metal pipe.

Erosion protection would be provided on those landfill areas prone to erosion due to swift-flowing water from the river. This protection would include armor stone (riprap) in areas that abut the river. Stone would also be placed on the north-facing slope of the western edge of the landfill and at the southern edge of the landfill to dissipate the energy of river flow.

Alternative 3 addresses some containment aspects for contaminated soils by providing limited repairs to the existing landfill cover. However, since repairs would be made on a visual basis, this alternative cannot ensure that all areas of contaminated soil would be covered. The landfill would remain largely unchanged and susceptible to erosion and infiltration of precipitation and surface water during flood events. Trees would not be removed from the landfill surface, further increasing the potential for infiltration. As noted for Alternative 2, this alternative does not address Ohio closure requirements for solid waste landfills.

The costs of Alternative 3 and the estimated time to implement this alternative are:

Capital Cost:	$ 1,427,300
Present Worth O & M Costs:	$ 741,000
Total Costs:	$ 2,168,300
Time to Implement:	3 Months

8.4 Alternative 4

Alternative 4 includes the following components:

- Ground-water monitoring
- Site restrictions
- Management of surface debris
- Natural clay cover over landfill
- Erosion control and drainage improvements

Alternative 4 contains the same site restrictions as described for Alternative 2. In addition, the ground-water monitoring program would be identical to the program described under Alternative 2. Erosion and drainage control improvements would be similar to those described for Alternative 3. However, instead of limited repairs to the landfill cover, Alternative 4 includes a clay cover over the entire landfill surface. All trees and other vegetation would be cut down to the surface, and steps would be taken to prevent their growth through the new cover. Precautions would be taken to minimize exposure of buried waste during removal of vegetation.

The new cover would consist of a well-compacted, low-permeability clay cover at least 24 inches thick. A top soil layer at least 24 inches thick would be placed over the clay cover. This top soil layer would be planted with grasses or other shallow-rooted plant species. The cover would exceed Ohio closure requirements for solid waste landfills, which call for only a well-compacted 24-inch cover of suitable material. The clay layer would have a maximum permeability of 10^{-7} cm/sec and would limit infiltration to less than 10 percent of precipitation.

Prior to cover installation, a detailed geotechnical investigation would be conducted to measure the properties of the soil and clay used to construct the cover. The purpose of this investigation would be to determine the stability of these materials under flood conditions. The cover would then be constructed with side slopes flat enough to protect the landfill from damage due to flooding. Construction would be done in such a manner as to minimize potential harm to the floodplain, as required by 40 CFR 6, Appendix A, Statement of Procedures on Floodplain Management and Wetlands Protection. In addition, the cap would be constructed, operated, and maintained to prevent washout of any hazardous wastes by a 100-year flood, as required by RCRA General Facility Standards in 40 CFR 264.18. These regulations have been identified as a location-specific ARARs.

The cap and fence would be inspected on a quarterly basis and repairs of any significant damage would begin within 30 days. The landfill would also be inspected for leachate and methane gas production on a quarterly basis. If leachate production occurred that could potentially adversely affect public health or the environment, a leachate collection system would be installed and the leachate would be collected and treated. If methane gas production occurred that could potentially adversely affect public health or the environment, a gas venting system would be installed.

The drainage ditch adjacent to the east side of the landfill would be improved by removing sediments as necessary. The pipe that runs under the landfill from the southern end of the ditch would be replaced by a 36-inch-diameter corrugated metal pipe. These improvements would allow water to drain from the field north of the landfill through the ditch and into the Scioto River. During the design of this alternative, the feasibility of removing contaminated sediments from the drainage ditch would be evaluated. These sediments could be dewatered as necessary and placed on the landfill surface prior to installing the clay cap. The drainage ditch, which is contiguous with the eastern side slope of the landfill, can be considered part of the landfill. Therefore, movement of sediments from the ditch to the landfill would consolidate hazardous wastes within a single disposal unit. This would not constitute "land disposal" under RCRA Subtitle C, so RCRA land disposal restrictions in 40 CFR 268 would not be ARARs. Sediment removal, in conjunction with capping, would reduce the possibility of contaminated surface water discharges from the ditch to the Scioto River.

Alternative 4 uses site restrictions to reduce risks from ingestion of ground water. Soil ingestion risks would be greatly reduced because the entire landfill surface, where highest soil contamination levels were found, would be covered. Long-term risks would be reduced by the application of a cover that reduces infiltration through the landfill.

The costs and time to implement Alternative 4 are listed below:

Capital Cost:	$ 3,173,000
Present Worth O & M Costs:	$ 1,094,500
Total Costs:	$ 4,267,500
Time to Implement:	10 Months

8.5 Alternative 5

Alternative 5 includes the following components:

- Ground-water monitoring
- Site restrictions
- Management of surface debris
- Natural clay cover over landfill
- Erosion control and drainage improvements
- Leachate collection system
- Gas venting system

Alternative 5 is identical to Alternative 4, except that the landfill cover would incorporate gas venting and leachate collection systems. The gas venting system would consist of a network of perforated pipe, approximately 6 inches in diameter, laid at 100-foot intervals in a 12-inch layer of gravel over the landfill surface. The gravel layer would have a geotextile fabric placed over the top to prevent spaces in the gravel layer from clogging. A 24-inch clay cover would be placed over the gravel layer, followed by a 24-inch soil and vegetation cover. Gas vents would connect to the perforated pipe and exit vertically through the clay and soil covers. Gases containing high concentrations of VOCs could be passed through a vapor phase carbon adsorption system to remove these contaminants.

The leachate collection system, located at the toe of the landfill, would consist of a perforated PVC pipe in a trench filled with granular drainage material. The pipe would catch and direct leachate to a collection point. From there, the leachate would be pumped to a temporary holding tank, treated, and discharged.

Alternative 5 would provide slightly greater protection than Alternative 4 because of the added leachate and gas collection systems. It would also comply with ARARs and would exceed Ohio solid waste landfill closure requirements.

The costs and time to implement Alternative 5 are as follows:

Capital Costs:	$ 4,341,200
Present Worth O & M Costs:	$ 2,374,600
Total Costs:	$ 6,715,800
Time to Implement:	10 Months

8.6 Alternative 6

Alternative 6 includes the following components:

- Ground-water monitoring
- Site restrictions
- Management of surface debris
- Natural clay cover over landfill
- Drainage improvements
- Leachate collection system
- Gas venting system
- Flood protection dike

Alternative 6 is identical to Alternative 5, except that additional flood protection would be provided by constructing a flood protection dike. The dike would extend around the west and north sides of the landfill. A concrete wall would be constructed at the south and northwest corners of the landfill, where there is insufficient space for a dike between the landfill and the river. The core of the flood dike would be constructed of an impervious clay material, and the side slopes would be constructed from clean soil. The sides of the dike along the river would be protected against surface water erosion by concrete riprap or rock fill. Stormwater within the flood control dike and the ditch east of the landfill would be collected through a gravity drainage system that discharges water to the river through check valves.

Alternative 6 addresses all site risks, including the potential risk of future releases from the landfill. The flood protection dike would provide additional protection to the landfill, once the new clay cover is installed. Alternative 6 would exceed Ohio solid waste closure requirements and would comply with ARARs for construction in floodplains.

The costs and implementation time for Alternative 6 are as follows:

Capital Costs:	$ 9,094,300
Present Worth O & M Costs:	$ 3,060,000
Total Costs:	$ 12,154,300
Time to Implement:	18 Months

8.7 Alternative 7

Alternative 7 includes the following components:

- Ground-water monitoring
- Site restrictions
- Management of surface debris
- Synthetic membrane cap over landfill
- Drainage improvements
- Leachate collection system
- Gas venting system
- Flood protection dike

Alternative 7 is similar to Alternative 6 except that a synthetic membrane cap would be placed over the landfill rather than a clay cap. The design of the landfill cap would be similar to the design specified in the Resource Conservation and Recovery Act (RCRA). A permeable geotextile fabric would be placed over the gas collection and venting system, followed by a 2-foot-thick layer of compacted clay with a permeability of 10^{-7} cm/sec. A 20-mil (minimum) synthetic membrane would be placed directly on the compacted clay layer. Finally, a 12-inch drainage layer with a hydraulic conductivity of at least 10^{-3} cm/sec would be placed over the synthetic liner, followed by a 24-inch-thick vegetated soil cover. The FS estimates that this cap would reduce infiltration through the landfill to less than 1 percent of precipitation. In addition, the flood protection dike would minimize the chance of flood waters contacting the landfill surface.

Alternative 7 addresses all site risks, including the potential risk of future releases from the landfill. This alternative would exceed Ohio solid waste closure requirements and would comply with ARARs for construction in floodplains.

The estimated costs and implementation time for Alternative 7 are:

Capital Costs:	$ 10,367,400
Present Worth O & M Costs:	$ 3,449,300
Total Costs:	$ 13,816,700
Time to Implement:	18 Months

8.8 Alternative 8

Alternative 8 includes the following components:

- Ground-water monitoring
- Site restrictions
- Management of surface debris
- Synthetic membrane cap over landfill
- Erosion control and drainage improvements
- Leachate collection system
- Gas venting system

Alternative 8 is similar to Alternative 7, without the flood protection dike. Instead of the dike, this alternative provides erosion control at the ends of the landfill using riprap as described under Alternative 3. All other components of this alternative have been described previously and are not repeated here.

The synthetic membrane cap over the landfill would cover most contaminated soils and would reduce long-term risks by reducing infiltration through the landfill cover to less than 1 percent of precipitation. This alternative would exceed Ohio solid waste closure requirements and would comply with ARARs for construction in floodplains.

The estimated costs and implementation time for Alternative 8 are:

Capital Costs:	$ 6,228,500
Present Worth O & M Costs:	$ 2,328,400
Total Costs:	$ 8,556,900
Time to Implement:	10 Months

8.9 Alternative 9

Alternative 9 includes the following components:

- Ground-water monitoring
- Site restrictions
- Management of surface debris
- Natural clay cover over top of landfill
- Improvements to landfill side slopes
- Erosion control and drainage improvements

Alternative 9 is similar to Alternative 3, except that a natural clay cover would be placed on the top of the landfill. This clay cover would be similar to the cover installed over the entire landfill surface in Alternative 4. Under Alternative 9, side slopes would not be covered, but would be repaired as necessary. These repairs would be made to increase the depth of the cover and provide continuously sloping surfaces. The tree cover on the landfill side slopes would be thinned out, but most trees would be left in place.

Drainage patterns would be surveyed, and areas such as erosion rifts and terraces would be filled and regraded to match adjacent contours. The fill applied to the side slopes would be compacted. Where side slopes are steep, additional stabilization would be accomplished by placing riprap or by supporting the slopes using sheet piling or soil cement.

Drainage control berms would be constructed at the top of the landfill to collect stormwater runoff. The water collected by the berms would be directed to the base of the side slopes by drainage chutes. The collection and drainage system would help reduce infiltration through the side slopes by limiting the area contacted by runoff from the top of the landfill.

Alternative 9 addresses some containment aspects for contaminated soils by covering the top of the landfill and providing limited repairs to the side slopes. However, this alternative cannot ensure that all areas of contaminated soil would be covered. The landfill side slopes would remain largely unchanged and susceptible to erosion and infiltration of precipitation and surface water during flood events. Trees would not be removed from the landfill surface, further increasing the potential for infiltration. This alternative would not meet Ohio closure requirements for solid waste landfills because of the incomplete repairs to side slopes.

The costs of Alternative 9 and the estimated time to implement this alternative are:

Capital Costs:	$ 2,483,500
Present Worth O & M Costs:	$ 955,900
Total Costs:	$ 3,439,400
Time to Implement:	8 Months

9.0 SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

U.S. EPA used the following nine criteria to evaluate each of the alternatives identified in the FS report. The remedial alternative selected for the site must represent the best balance among the evaluation criteria.

1. **Overall Protection of Human Health and the Environment** addresses whether a remedy adequately protects human health and the environment and whether risks are properly eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2. **Compliance with Applicable or Relevant and Appropriate Requirements** addresses whether a remedy meets all state and federal laws and requirements that apply to site conditions and cleanup options.

3. **Long-Term Effectiveness and Permanence** refers to the ability of a remedy to reliably protect human health and the environment over time once cleanup goals have been met.

4. **Reduction of Toxicity, Mobility, or Volume** are three principal measures of the overall performance of an alternative. The 1986 Superfund Amendments and Reauthorization Act (SARA) emphasizes that, whenever possible, U.S. EPA should select a remedy that will permanently reduce the level of toxicity of the contaminants at the site, the spread of contaminants away from the site, and the volume, or amount, of contaminants at the site.

5. **Short-Term Effectiveness** refers to the likelihood of any adverse impacts to human health or the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

6. **Implementability** is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement the remedy.

7. **Cost** includes capital and operation and maintenance costs of implementing a remedy.

8. **State Acceptance** indicates whether, based on its review of the RI, EA, FS, and Proposed Plan, the State of Ohio (OEPA) concurs with, opposes, or has no comment on the alternative U.S. EPA is proposing as the remedy for the site.

9. **Community Acceptance** indicates whether the public concurs with the remedy presented in U.S. EPA's proposed plan.

After evaluating all the remedial alternatives developed in the FS, using the nine criteria just described, U.S. EPA has selected Alternative 4 to address contamination at the Bowers Landfill Superfund site. The rationale for this selection is provided below.

9.1 Overall Protection of Human Health and the Environment

Alternative 4 would protect both human health and the environment. This alternative would reduce potential risks from ingestion of contaminated soil by installing a fence around the site and by covering the most highly contaminated soils with 4 feet of clay and soil. The FS estimates that probable case risks for soil ingestion would be reduced to zero. Some residual risk would remain due contaminated soils in the field west of the landfill. To estimate exposure to this remaining contamination, the FS assumed that (1) 50-kg teenagers would scale the fence surrounding the site 10 times per year over a 5-year period, (2) these teenagers would ingest 200 mg of contaminated soil per visit, and (3) 50 percent of the contaminants in ingested soil would be absorbed by the body. Based on these assumptions and the maximum soil contaminant concentrations in the areas not affected by the cover, the HI for noncarcinogenic risks would be reduced from 3.48 to 0.24. The carcinogenic risk, based on average lifetime exposure, would be reduced from 3×10^{-6} to 4×10^{-8}. Risk reductions for Alternatives 5 through 8, which cover the same areas of soil contamination, would be identical. In contrast, Alternatives 2, 3, and 9 do not cover the entire landfill surface and would provide a smaller risk reduction. The FS estimates that these alternatives would result in an HI of 0.28 for noncarcinogenic effects and a carcinogenic risk of 5×10^{-7}.

Alternative 4 would reduce risks from ingestion of ground water by placing access restrictions on the area west of the landfill. These restrictions would prevent the use of this area as a future ground-water source. In addition, the clay and soil cap would reduce infiltration to less than 10 percent of precipitation, reducing the likelihood of future ground-water contamination. Alternatives 5 and 6, which have a similar cap, would also reduce infiltration to less than 10 percent. Alternatives 7 and 8, which include a synthetic membrane cap, would provide much greater reductions in infiltration.

Ground-water users farther from Bowers Landfill would be protected by the monitoring program included as part of Alternative 4. This program would include installing and sampling additional wells south and west of the landfill. Expansion of the monitoring network to the south would detect any future migration of ground-water contamination toward the City of Circleville's wellfield, 1½ miles south of the landfill. Alternative 4 would include a corrective action program that would allow prompt response to any significant increases in ground-water contamination that might occur in the future.

Overall, Alternative 4 would be more protective of human health and the environment than Alternatives 1, 2, 3, and 9. These alternatives include either no modifications or limited modifications to the existing landfill surface.

Alternative 4 would be somewhat less protective than Alternatives 5, 6, 7, and 8, which include more extensive remediation. For example, Alternative 7, the most protective alternative, also includes a synthetic membrane cap, a flood protection dike, a leachate collection system, and a gas venting system. The overall effect of these additional measures would not increase protection with respect to ingesting contaminated soils or ground water. The flood protection dike included in Alternatives 6 and 7 may prolong the effective life of the landfill cap due to less erosion from surface water. However, the cap installed under Alternative 4 would be designed and constructed to resist flood damage or washout of wastes by a 100-year flood and would have a minimum 30-year lifetime. The multilayer cap included in Alternatives 7 and 8 might provide greater reductions in infiltration, thus providing greater protection against the generation of contaminated leachate and future ground-water contamination. However, there is little evidence of a leachate problem at Bowers Landfill, and current levels of ground-water contamination are low. Therefore, the low-permeability clay cap constructed under Alternative 4 would provide adequate protection of ground water.

9.2 Compliance with Applicable or Relevant and Appropriate Requirements

Alternative 4 would comply with applicable or relevant and appropriate state and federal requirements (ARARs). These requirements include action-specific ARARs related to closure of Bowers Landfill, location-specific requirements related to the location of the landfill within the 100-year floodplain of the Scioto River, and chemical-specific ARARs for contaminants identified in environmental media at the landfill.

Alternative 4 is primarily a closure plan for Bowers Landfill, and the major action-specific ARARs to be considered are those related to landfill closure. Waste disposal at Bowers Landfill ended around 1968, before the effective date of RCRA. Thus, RCRA Subtitle C requirements for the treatment, storage, and disposal of hazardous wastes are not applicable to remedial actions at the landfill. Additionally, the wastes in Bowers Landfill contain large volumes of low-toxicity material, widely dispersed over a large area that bears little resemblance to the discrete units regulated under RCRA Subtitle C. Nevertheless, portions of RCRA Subtitle C requirements can be considered relevant and appropriate.

The preamble to proposed revisions to the National Contingency Plan (53 Federal Register, December 21, 1988) describes several options for closure of Superfund sites, based on RCRA requirements. One option is "closure with wastes in place." This option requires a final cover over the contaminated materials and post-closure care, including maintenance of the cover, ground-water monitoring, and corrective action if ground-water protection standards are exceeded in the future. A second option is "alternate land disposal closure." Under this option, landfill cover requirements are relaxed because (1) the cover will reduce risks due to direct contact with wastes and (2) the wastes appear to pose a limited threat to ground water.

Alternative 4 falls between these two options, but closer to the first option. The clay cap installed as part of this alternative would have a permeability of 10^{-7} or less. This cap would meet the requirements for the clay layer at the bottom of a hazardous waste landfill, as described in 40 CFR 264.301. Because current ground-water contamination levels at Bowers Landfill suggest a limited threat to ground water, a synthetic membrane layer is not considered a necessary component of the cap. On the other hand, Alternative 4 would exceed the relaxed cover requirements for "alternate land disposal closure." These requirements are more similar to State of Ohio closure regulations for solid waste landfills, which call for a "well compacted layer of final cover material . . . to a depth of at least two feet." Alternative 4 would substantially exceed this requirement by providing a 4-foot-thick cover, including a 2-foot layer of low-permeability clay.

Alternative 4 would also comply with location-specific ARARs. Because Bowers Landfill is located within the 100-year floodplain of the Scioto River, construction within the floodplain is unavoidable. However, Alternative 4 would be constructed in a manner that would minimize potential harm to the floodplain, as specified by floodplain management requirements in 40 CFR 6. In addition, the cap would be constructed, operated, and maintained to prevent washout of any hazardous wastes by a 100-year flood, as required by RCRA General Facility Standards in 40 CFR 264.18.

Alternative 4 would attain chemical-specific ARARs for ground water by reducing infiltration of precipitation and floodwaters through the landfill waste. Ground-water results from the RI showed that benzene slightly exceeded the MCL of 5 µg/L in one sample from well P-6B. Levels in other samples from this well were below the MCL, and benzene was not detected in any of the remaining 12 downgradient wells. Barium also exceeded the MCL in three samples collected from a single well, well P-5B. However, the average barium concentration was well below the MCL. The ground-water monitoring program implemented under Alternative 4 would require regular and systematic sampling and would meet the substantive requirements for ground-water monitoring under RCRA in 40 CFR 264, Subpart F. The monitoring program would include provisions for corrective action should contaminant levels significantly increase in the future.

Additionally, the monitoring program proposed for Alternative 4 would include collecting surface water samples from the ditch east of Bowers Landfill. Surface water monitoring would verify that discharges from the ditch are complying with Ohio Water Quality Standards as described in OAC 3745-01.

Alternatives 5 and 6 would comply with ARARs to the same extent as Alternative 4. Alternatives 7 and 8, by including a synthetic membrane layer in addition to the low-permeability clay layer, would come closer to meeting RCRA requirements for closure with hazardous wastes in place.

Alternatives 1, 2, 3, and 9 would leave some or all of the current soil and vegetation cover intact. These alternatives would not comply with relevant and appropriate portions of RCRA closure regulations or with Ohio closure standards for solid waste landfills. Further, these alternatives would not meet location-specific ARARs because they would not be constructed, operated, and maintained to prevent washout of hazardous wastes by a 100-year flood. Also, Alternatives 1, 2, 3, and 9 would not significantly reduce infiltration of precipitation and flood waters through the landfill, and may not result in attainment of MCLs in ground water.

9.3 Long-Term Effectiveness and Permanence

Because of the large amount of material within Bowers Landfill, the small known percentage of hazardous waste, and the limited risks identified in the EA report, it was not feasible to develop a permanent remedy for Bowers Landfill. However, the low-permeability clay cap specified by Alternative 4 would be designed for a minimum 30-year lifetime. The long-term effectiveness of Alternative 4 would be ensured by ground-water monitoring and maintenance of the clay cap. Monitoring wells downgradient of the landfill would be sampled on a regular basis to determine if contaminant concentrations in ground water are increasing significantly over time. The monitoring program would also include a corrective action component, requiring further remedial action if a significant increase in ground-water contamination is detected. The maintenance program for Alternative 4 would include regularly mowing the vegetation on the cap; inspecting the surface for cracks, settlement, ponding, and erosion; completing appropriate repairs to the cap; and repairing the fence as necessary. In addition to regularly scheduled inspections, additional inspections would be made after floods.

Similar monitoring, inspection, and maintenance would be needed to maintain the long-term effectiveness of Alternatives 5, 6, 7, and 8. These alternatives include additional components, such as a synthetic membrane cap or a flood protection dike, that may increase long-term effectiveness. However, the additional components would not greatly increase long-term effectiveness compared to Alternative 4. Current landfill conditions, 20 years after disposal ceased, indicate that Alternative 4 would be sufficiently protective in the long-term. Thus, the slightly higher long-term effectiveness of Alternatives 5, 6, 7, and 8 does not justify the substantially higher costs of these alternatives.

In contrast, Alternatives 1, 2, 3, and 9 would be much less effective in the long term. Alternatives 1 and 2 do not include any repairs to the existing landfill cover. Alternatives 3 and 9 make limited repairs, but would not cover the entire landfill surface. Alternatives 1, 2, 3, and 9 would also leave trees on the landfill side slopes. These alternatives would allow greater infiltration of precipitation and flood waters than Alternatives 4 through 8 because of the incomplete cover and because tree roots probably penetrate into waste materials below the cover. These alternatives would also have a greater potential for long-term failure of the landfill side slopes. Over time, the combination of saturated soil conditions during flooding and high winds could result in complete uprooting of trees, exposing underlying waste materials.

9.4 Reduction of Toxicity, Mobility, or Volume

None of the remedial alternatives evaluated in the FS report involves treating source materials from Bowers Landfill. Thus, none of the alternatives would reduce the toxicity or volume of hazardous constituents within the waste. Treatment alternatives for the source materials were considered but were not evaluated in detail for several reasons. First, most of the estimated 130,000 cubic yards of waste material in Bowers Landfill consists of general refuse and municipal solid waste. Although the exact amount of hazardous waste placed in the landfill is not known, it is probably a small percentage of the total waste volume. The large volume and variable composition of wastes makes treatment impractical. Second, no operating records exist for the landfill. Thus, it is not feasible to identify locations where hazardous wastes might have been placed. Third, the relatively low levels of contamination found during the RI would not be effectively reduced by treatment.

Alternatives 5, 6, 7, and 8 include provisions for installing a leachate collection and treatment system, which is a treatment alternative. This system may reduce the volume and mobility of leachate if leachate contains hazardous constituents. However, ground-water analyses from the RI did not indicate significantly elevated contaminant levels in the upper aquifer, which would be the first target of a leachate plume. Additionally, the low-permeability clay cap installed under Alternative 4 should greatly reduce future leachate generation by reducing infiltration through the landfill. For these reasons, the installation of a leachate collection system was considered but then rejected.

Similarly, Alternatives 5, 6, 7, and 8 include a collection system for gases generated by the landfill. Collected gases could be treated, if necessary. However, Alternative 4 does not include gas collection and treatment for the following reasons. First, air monitoring results from the RI showed that air concentrations of volatile organic compounds (VOCs) at Bowers Landfill are similar to off-site background concentrations. Second, the landfill has a low potential to emit VOCs to air because of the low concentrations of VOCs in soils, sediments, and surface water on or adjacent to the landfill. Finally, because of the age of the landfill, most of the potential gas generation may already have taken place. These gases would have readily escaped through the highly permeable soil that now covers the landfill.

Alternative 4 would reduce the mobility of waste materials within the landfill. The FS report estimates that the low-permeability clay cap included in this alternative will reduce direct infiltration into the landfill surface by over 90 percent. This is much more effective than the current soil and vegetation cover. Reducing the amount of water that contacts waste materials within the landfill should reduce the mobility of these materials. Alternatives 5 and 6, which also include a clay cap, would provide similar reductions in infiltration. Alternatives 7 and 8, which include a synthetic plastic liner and a clay cap, would further reduce infiltration (estimated in the FS report as greater than 99 percent). However, these much greater reductions do not appear warranted by current levels of ground-water contamination at Bowers Landfill.

In contrast, Alternatives 1 and 2 (no repairs to the existing cover), Alternative 3 (limited repairs to the cover), and Alternative 9 (application of a partial clay cover) would provide either no reduction or less reduction in infiltration. Each of these alternatives would leave trees on the landfill side slopes. Root systems of these trees would provide a direct path between flood waters or precipitation and the underlying waste materials.

DECLARATION FOR THE RECORD OF DECISION

Site Name and Location

Bowers Landfill Site
Circleville, Ohio

Statement of Basis and Purpose

This decision document presents the selected remedial action for the Bowers Landfill site in Circleville, Ohio, developed in accordance with CERCLA, as amended by SARA, and the National Contingency Plan. This decision is based on the administrative record for this site. The attached index identifies the items that comprise the administrative record upon which the selection of the remedial action is based.

The State of Ohio concurs with U.S. EPA's remedy selection. A letter of concurrence is attached to this Record of Decision.

Description of the Selected Remedy

The primary role of the Bowers Landfill RA is:

1. To properly close the site that has evidence of hazardous waste disposal; and
2. To address potential site risks.

Since the site has a very poor cover, site records indicate evidence of hazardous waste disposal and low levels of contamination were found, the site will be closed in accordance with Ohio Sanitary Landfill Closure standards. This will include installing a 4 ft. thick clay and soil cover over the landfill. Erosion and flood control measures, and drainage improvements will be included.

Potential risks are posed by ground water immediately downgradient of the site and exposure to contaminated soils on or near the landfill. The selected remedy will address the ground water threats by restricting future ground water use between the landfill and the Scioto river and by installing a clay cap that will reduce infiltration, reducing the likelihood of future ground water contaminants. Additionally, because wastes will remain on-site, the selected remedy will provide for long term ground-water monitoring and corrective action measures should monitoring indicate unacceptable risks due to increased contamination. The selected remedy will address the soil threats by capping contaminated soils and limiting access to the landfill area.

The major components of the selected remedy are:

- Monitoring ground water
- Restrict site use and access
- Manage surface debris
- Improve erosion control, flood protection and drainage
- Install natural clay cover over landfill

Declaration

The selected remedy is protective of human health and the environment, attains Federal and State requirements that are applicable or relevant and appropriate to the remedial action, and is cost effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this site. Because treatment of the principal threats of the site was not found to be practicable, however, this remedy does not satisfy the statutory preference for treatment as principal element of the remedy.

Because this remedy will result in hazardous substances remaining on-site above health-based levels, a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Frank M. Covington

for Valdas V. Adamkus, Regional Administrator
U.S. Environmental Protection Agency, Region V

3/31/89

Date

9.5 Short-Term Effectiveness

The FS report estimates that Alternative 4 could be constructed within 10 months; the alternative would effectively protect human health and the environment immediately upon completion. This construction period is longer than the 1 month required for Alternative 3, which includes only limited repairs to the existing landfill cover. Alternatives 5, 8, and 9 would require construction periods similar to that for Alternative 4. However, Alternatives 6 and 7 would require approximately 18 months to complete due to the more extensive construction activities.

Alternative 4 and the other alternatives could be constructed without significant adverse impacts on the environment and people living near Bowers Landfill. However, all the alternatives, with the exception of those requiring no construction, would present general safety-related risks to construction workers. In addition, earth moving activities could generate dust from the landfill surface that could potentially affect workers and surrounding populations. However, these effects could be minimized by using standard dust suppression methods, such as watering. Additionally, air monitoring would be conducted to measure contaminants released during construction. Construction practices would be modified as necessary to prevent unacceptable releases.

A major impact of Alternative 4 on the surrounding community would be increased truck traffic near the site. The FS report estimates that approximately 8,000 truckloads of material would enter and leave the site during construction. Over a 10-month period, this figure corresponds to an average of 40 trucks per work day. This could inconvenience local residents, adversely affect local roads, and present a slightly greater risk of traffic accidents near the site. Increased truck traffic is also a component of other construction alternatives. The estimated total number of trucks varies from 1,225 for Alternative 3 to 12,000 for Alternatives 6 and 7.

9.6 Implementability

Alternative 4, and all other alternatives evaluated in the FS report, could be implemented using standard earth moving equipment and construction techniques. However, the primary problem of flooding could affect the implementation of all alternatives except Alternative 1 (no action). Construction activities would have to be scheduled around flood events, since the area adjacent to the landfill is inundated approximately 30 days per year. Construction of Alternatives 4 through 9 is estimated to require 8 to 18 months to complete. Thus, remedial action would have to be segmented into work areas. Work on one area of the landfill would be completed before construction of the next area began. This method would minimize the area of the landfill exposed to any particular flood event.

A second implementation problem, common to Alternatives 3 through 9, is the availability of low-permeability clay near the landfill. These alternatives would require substantial amounts (up to 50,000 cubic yards) of clay for construction. The FS report assumes that a suitable clay source can be found locally. However, if a local source cannot be found, increased transport of clay would be required, resulting in increased costs.

A third implementation problem affects Alternatives 3 through 9. These alternatives would require removing existing vegetation from all or part of the landfill. This activity, especially the removal of large trees, could expose underlying waste materials. Precautions would be taken to minimize this possibility.

None of the alternatives appears to present any major administrative problems that would affect implementation. However, the flood protection dike included in Alternatives 6 and 7 would involve substantial construction in the Scioto River floodplain. Construction of the dike would remove approximately 80 acres of land from the 100-year floodplain, since the dike would prevent floodwaters from covering this area. This would increase the height of floodwaters upstream and downstream of the landfill and may cause additional areas to flood. Because of this potential problem, Alternatives 6 and 7 may be administratively more difficult to implement.

9.7 Cost

The estimated total present worth cost for Alternative 4 is approximately $4.3 million. This estimate includes capital costs of approximately $3.2 million for fencing, drainage improvements, erosion and flood control measures, and installation of the landfill cap. Annual operation and maintenance (O&M) costs for this alternative are estimated at approximately $116,000 and include expenses related to ground-water monitoring and general maintenance of the fence, drainage system, erosion and flood control measures, and landfill cap. The present worth of annual O&M costs (over a 30-year period at a 10 percent interest rate) is approximately $1.1 million.

Alternative 4 would be more expensive to implement than Alternatives 1, 2, 3, and 9. However, these alternatives would not provide the degree of overall protection offered by Alternative 4. Alternatives 5, 6, 7, and 8 would provide somewhat greater protection than Alternative 4, but at a much greater cost. Estimated total present worth costs for these alternatives range from $6.7 million to $13.8 million. Increased costs are associated with more sophisticated technologies such as a leachate collection system and gas venting system (Alternatives 5 through 8), a flood protection dike (Alternatives 6 and 7), and a landfill cap with a synthetic liner (Alternatives 7 and 8).

The total cost of Alternative 5 is approximately 50 percent higher than Alternative 4 ($6.7 million compared to $4.3 million), while Alternatives 6 through 8 involve much greater costs ($12.2 million, $13.8 million, and $8.6 million respectively). Although these alternatives may offer increased long-term protection, the relative cost increase outweighs the expected benefits. For example, the installation of a gas venting system does not appear necessary. Several factors indicate that gas generation is not a problem at Bowers Landfill. Such factors include the age of the landfill, the porous nature of the current landfill cover, the frequent flooding of the landfill, and the lack of elevated VOC and gas levels during the RI. Likewise, the installation of a leachate collection system does not appear justified because of little evidence that leachate is significantly affecting the upper aquifer. The low-permeability clay cap installed under Alternative 4 would further reduce leachate generation. The installation of a RCRA cap and flood protection dike are likewise not justified. A RCRA cap would decrease infiltration to less than 1 percent of precipitation. However, at a much lower cost, the clay cap included in Alternative 4 would decrease infiltration to less than 10 percent of precipitation. With respect to the flood protection dike, the landfill's north side appears to be stable under current conditions. It should be possible to install a new landfill cover that will resist flood damage without the added expense of a flood protection dike.

U.S. EPA has made minor revisions to remedial alternatives based on comments received during the public comment period. As a result, costs may be slightly higher than the estimates presented in this section.

9.8 State Acceptance

The State of Ohio has concurred with U.S. EPA's selection of Alternative 4 as the preferred remedial alternative for Bowers Landfill. A letter of concurrence is attached to this Record of Decision.

9.9 Community Acceptance

U.S. EPA's preferred remedial alternative for Bowers Landfill was presented at the start of the public comment period through distribution of a fact sheet, publication of display advertisements in the Cirvleville, Ohio, Herald, and placement of the proposed plan in the site information repositories. A formal public meeting to discuss the proposed plan was held in Circleville on February 28, 1989. Comments received indicate that many residents are concerned about U.S. EPA's preferred alternative.

These comments focus on three general areas. First, several residents commented that U.S. EPA appears to be closing Bowers Landfill as a solid waste landfill, with no consideration of the hazardous wastes that were disposed of at the site. These residents prefer Alternatives 7 and 8, which include additional protective measures such as a synthetic liner (in addition to the clay cap) and a flood protection dike. U.S. EPA has pointed out in this Decision Summary that relevant and appropriate portions of hazardous waste regulations in RCRA Subtitle C have been adequately considered in the design and selection of Alternative 4. This issue is discussed further in the Responsiveness Summary.

Second, several residents expressed concern about U.S. EPA's proposed ground-water monitoring plan for Bowers Landfill. These concerns are directly related to protection of public drinking water supplies -- specifically, the City of Circleville's wellfield located 1½ miles south of the landfill. To address these concerns, the ground-water monitoring program will include installing and sampling additional monitoring wells south of Bowers Landfill. Further, U.S. EPA will require that corrective action program options be developed as part of the monitoring program. This will allow prompt response if ground-water contaminant levels exceed levels of concern at any compliance point in the monitoring system.

Finally, several residents expressed concern that U.S. EPA's preferred alternative represents a conceptual design, specific elements of which will be determined later with limited input from local residents. To address this concern, U.S. EPA will consider extending the Bowers Landfill Information Committee (see Section 3.0) through the remedial design/remedial action phase of this project.

10.0 THE SELECTED REMEDY

After evaluating all the feasible alternatives, U.S. EPA is selecting a remedy that consists of five components: (1) ground-water monitoring; (2) site access restrictions; (3) management of surface debris; (4) erosion control and drainage improvements; and (5) a natural clay cover over the landfill. These five components are described in detail below.

10.1 Ground-Water Monitoring

Under Alternative 4, a long-term program will be implemented to monitor contaminant concentrations and migration. This program will include installing additional monitoring wells south of Bowers Landfill (between the landfill and the Circleville municipal wellfield) and west of the landfill (between the landfill and the Scioto River). These new wells, existing monitoring wells, and possibly residential wells near the landfill will be sampled regularly. At a minimum, the program will meet the substantive requirements for ground-water monitoring under RCRA as described in 40 CFR 264, Subpart F.

The installation of three additional ground-water monitoring well clusters is necessary to develop a ground-water monitoring program that will adequately detect potential future releases of contaminants. These well clusters will consist of three wells; a shallow well that will be located in the upper portion of the saturated alluvial aquifer, an intermediate well that will be located between the water table and the bedrock, and a deep well that will be located just above the bedrock. Two of these well clusters will be installed west of the landfill. One cluster will be installed between well location 5 and well location 6 and the other between well W-10 and the bend of the landfill (see Figure 3). The third well cluster will be installed off-site between the landfill and the Circleville municipal wellfield. The installation of well clusters in addition to these may also be considered.

The monitoring wells will be sampled on a bimonthly basis for the first year and quarterly for years 2 through 4. During the first year, samples will be analyzed for the full Target Compound List (TCL). A reduced TCL may be considered after the first year. If the levels of contaminants in ground water do not increase over this time period, the sampling schedule will be reevaluated and a reduction in the frequency of sampling may be considered. A statistical test will be developed to determine when a significant increase in the level of contaminants has occurred.

Should a significant increase in the levels of contaminants occur, it will automatically trigger a RCRA corrective action. If the levels of contaminants in ground water exceed MCLs, where available, or health-based levels, where MCLs are not available, resampling will occur within 14 days. (Health-based levels are concentrations corresponding to a cancer risk of 10^{-6} for carcinogenic contaminants and a hazard index (HI) greater than 1 for noncarcinogenic contaminants.) If the resampling verifies that there has been a significant increase in contaminant levels, a corrective action program will be implemented. Corrective action may include such measures as establishing alternate concentration limits (ACLs), collecting and treating ground water, or removing the source of contamination.

The surface water in the drainage ditch to the east of the landfill will be sampled on a quarterly basis as part of the monitoring program. Monitoring will verify that discharges from the ditch are in compliance with Ohio Water Quality Standards, as described in the Ohio Administrative Code (OAC) 3745-01. A corrective action program will be implemented if contaminant levels in the ditch exceed these standards.

10.2 Site Access Restrictions

Efforts will be made to procure deed restrictions prohibiting ground-water extraction in the field west of the landfill and restricting disturbance of the landfill surface. The viability of continued farming immediately west of the landfill will be evaluated, and, if shown to be necessary, efforts would be made to prohibit such farming by imposition of deed restrictions. A 6-foot fence will be placed around the landfill, the drainage ditch to the east, and the field to the west to limit site access. The location of the fence is shown on Figure 6.

10.3 Management of Surface Debris

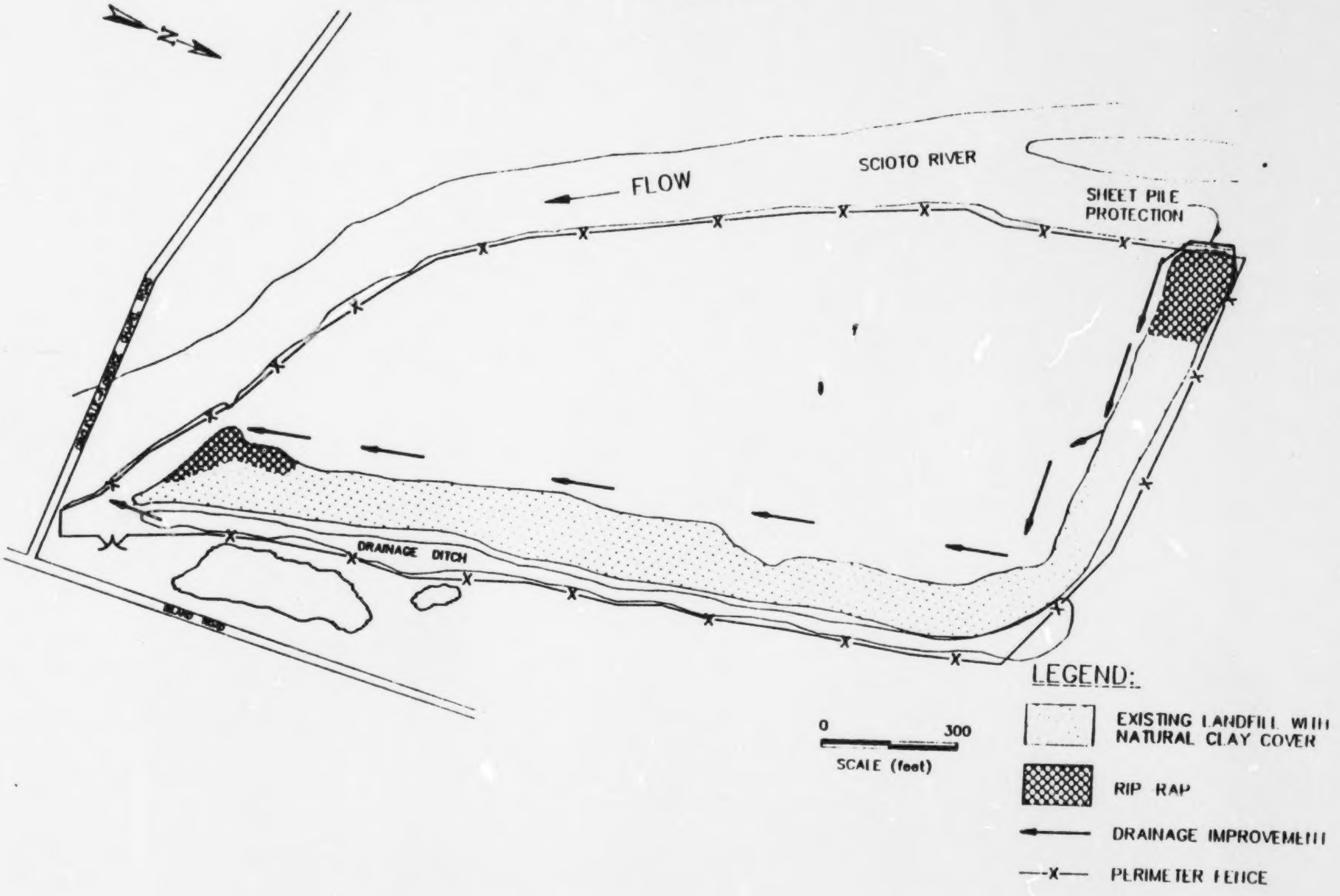
The landfill area and its immediate vicinity will be cleared of surface debris. Most of the currently exposed material consists of shredded or rolled plastic film, but rusted and partially decomposed remains of appliances, discarded tires, domestic waste, and empty drums are also evident. The visible waste items will be removed from the site by a front-end loader, placed in a lined truck, and transported to a suitable hazardous waste landfill. If the debris is determined to be nonhazardous, it will be disposed of in a solid waste landfill.

Trees on the landfill will be cut down with chain saws, and tree stumps will be ground down to the land surface. Smaller vegetation, less than 2 feet in diameter, will be cut down with mechanical equipment such as bush hogs. As much subsurface vegetation as feasible will be removed, without exposing significant amounts of waste. Exposed cover will be treated as necessary to prevent tree growth through the new cover. All vegetative material will be hauled to a local landfill unless tissue samples indicate that materials are potentially hazardous. If potentially hazardous, this material will be disposed of in an approved off-site hazardous waste disposal facility.

10.4 Erosion Control and Drainage Improvements

Erosion control will be provided for those areas of the landfill prone to the scouring effects of flood waters. The areas most likely to be subjected to these effects are the northwest

FIGURE 6. - SITE ALTERNATIVE 4


N
SCIOTO RIVER
FLOW
SHEET PILE PROTECTION
DRAINAGE DITCH
0
300
SCALE (feet)
LEGEND:
EXISTING LANDFILL WITH NATURAL CLAY COVER
RIP RAP
DRAINAGE IMPROVEMENT
PERIMETER FENCE

and southeast portions of the landfill that abut the Scioto River. A system of armor stone (riprap) will be used in these areas to supplement the erosion resistance provided by the new cover. This riprap will be placed on the landfill in areas shown on Figure 6. If riprap cannot be effectively placed on steeper slopes, sheet piling will be used to anchor the riprap. If sheet piling proves ineffective, a concrete wall may be used.

Site drainage will be improved to prevent ponding of water against the landfill. The area between the landfill and the river will be regraded to allow water to drain away from the landfill. The site will also be regraded to allow for drainage flow from north to south to the river.

The drainage ditch on the eastern side of the landfill will also be improved. Where necessary, side slopes will be improved to prevent erosion. The high point between the north end of this ditch and the open field north of the landfill will be cut down to prevent ponding of water against the northern part of the landfill during high-water conditions. High points within the ditch will also be cut down to allow water to drain through the ditch. Sediments removed during this process, and possibly other contaminated sediments, could be dewatered as necessary and placed on the landfill surface prior to installing the clay cap. Removal of contaminated sediments will reduce the possibility of contaminated surface water discharges from the ditch to the Scioto River. The discharge pipe at the southern end of the drainage ditch will be replaced with a larger one. A 36-inch-diameter corrugated metal pipe will be placed under the southern end of the landfill and will discharge to the river. The point where the ditch meets the pipe will be lined with compacted clay and reinforced with riprap. The pipe will have a 2 percent slope to prevent blockage with sediments.

10.5 Natural Clay Cover Over Landfill

Prior to construction of the landfill cover, a detailed geotechnical investigation will be conducted to measure the properties of the existing landfill surface and of soil and clay used for the cover. The purpose of this investigation will be to determine the stability of these materials under flood conditions. The cover will then be constructed with side slopes flat enough to provide adequate stability when the Scioto River floods. Although there is no apparent need for a landfill gas collection system, this determination could be reevaluated as part of the geotechnical investigation. A soil gas study of the landfill could verify that VOCs are not present in sufficient quantities to warrant collection.

The landfill cover will be constructed in segments to minimize potential damage due to flooding during construction. Work on one area of the landfill will be completed before construction of the next area begins. After each landfill segment has been prepared, a well compacted clay layer, at least 24 inches thick, will be placed on the landfill cap and side slopes. The clay will be added in lifts, not exceeding 6-inches, and compacted before more clay is added. The clay layer will have a maximum permeability of 10^{-7} cm/sec. Each lift will be tested according to a stringent quality assurance program to verify that this specification is met.

A top soil layer at least 24 inches thick will be placed over the clay layer (Figure 7). This layer will also be applied and compacted in 6-inch lifts. The final cover will have sufficient horizontal-to-vertical side slopes so as to prevent failure during worst case flooding conditions. The entire surface of the completed cover will be reseeded, fertilized, and watered to assure plant growth. The plant species used will have root systems that are not expected to penetrate below the upper 24 inches of cover.

The cover will be inspected and maintained on a quarterly basis. The maintenance program will include regularly mowing the vegetation on the cap; inspecting the surface for cracks, settlement, ponding, and erosion; completing appropriate repairs to the cap; and repairing the fence. Repairs to all significant damage will begin within 30 days. In addition to regularly scheduled inspections, additional inspections will be made after flood events.

The landfill will also be inspected for leachate and methane gas production on a quarterly basis. If leachate production occurs that could potentially adversely affect public health or the environment, a leachate collection system will be installed and the leachate will be collected and treated. If methane gas production occurs that could potentially adversely affect public health or the environment, a gas venting system will be installed.

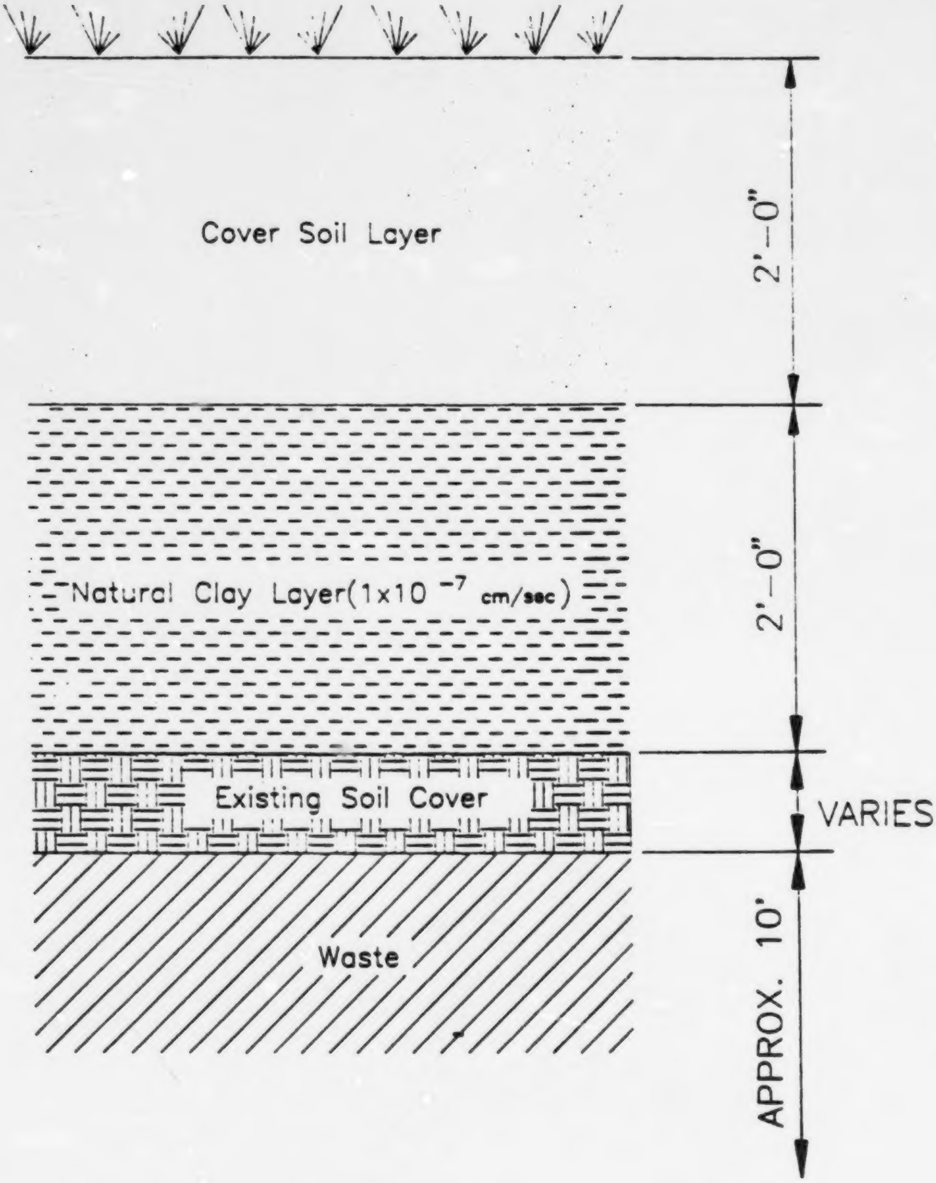
10.6 Reduction of Site Risks

The selected remedy addresses the major risks for Bowers Landfill as identified in the EA. Risks from ingesting contaminated soils will be reduced by covering the landfill (thus covering most highly contaminated soils) and by restricting access to the site. Soils in the field west of the landfill that contain lesser amounts of contamination will not be covered. The residual risks from ingesting these soils include an insignificant noncarcinogenic risk (HI of 0.24) and a carcinogenic risk of 4×10^{-8}. Risks from ingesting contaminated ground water immediately downgradient of the landfill will be reduced to zero by future ground-water use restrictions.

Alternative 4 also reduces potential long-term risks associated with the landfill. The low-permeability clay cover will greatly reduce infiltration of precipitation and flood waters, compared to the current cover. Thus, the mobility of contaminants remaining in the landfill will

FIGURE 7

DETAIL OF NATURAL CLAY COVER


Cover Soil Layer
2'–0"
Natural Clay Layer(1x10 $^{-7}$ cm/sec)
2'–0"
Existing Soil Cover
VARIES
Waste
APPROX. 10'

be reduced. The cover will isolate waste within Bowers Landfill under a minimum 4-foot thickness of cover material and will be designed to provide long-term stability during floods.

11.0 STATUTORY DETERMINATIONS

The remedial action selected for implementation at the Bowers Landfill site satisfies the statutory requirements of CERCLA Section 121. The selected remedy is consistent with the NCP, protects human health and environment, attains ARARs, and is cost-effective. The selected remedy does not satisfy the statutory preference for a permanent solution in that it leaves untreated waste on-site. Nor does the selected remedy reduce the toxicity or volume of wastes. However, source control and containment components of the selected remedy should significantly reduce the mobility of contaminants from the landfill.

11.1 The Selected Remedy Is Protective of Human Health and the Environment

The remedial alternative selected for Bowers Landfill will reduce current and potential future risks to human health and the environment by the following means:

- Preventing exposure to contaminated soils by covering contaminated soils with a 4-foot-thick impermeable clay and soil cap and by fencing the site area. The cap and fence will be maintained on a regular basis, with an increased inspection schedule during floods.
- Preventing exposure to contaminated ground water by restricting access to downgradient property. Efforts will be made to obtain deed restrictions to prohibit extraction and use of ground water from this area.
- Limiting future ground-water contamination by reducing infiltration through contaminated soils and the landfill. The effectiveness of the cover will be evaluated by a long-term ground-water monitoring program. The program will require regular and systematic sampling of monitoring wells west and south of the landfill and possibly from residential wells south of the landfill.
- Reducing potential future exposure to wastes in Bowers Landfill by constructing a stable cover designed to withstand frequent flooding of the Scioto River.
- Reducing potential sources of surface water contamination for the Scioto River by removing contaminated sediments from the drainage ditch that is contiguous with the east side of Bowers Landfill. Discharges from the ditch will be monitored for compliance with Ohio Water Quality Standards.

11.2 The Selected Remedy Attains ARARs

The selected remedy will meet or attain all applicable or relevant and appropriate federal and state requirements. These requirements include:

- Ohio requirements for the closure of solid waste landfills (OAC 3745-27-09 and OAC 3745-27-10). The final landfill cover will exceed the required thickness of 2 feet and will meet all other substantive requirements within these regulations.

- Relevant and appropriate portions of RCRA requirements for closure of hazardous waste landfills with wastes in place. The low-permeability clay layer (maximum of 10^{-7} cm/sec) will comply with portions of the cover requirements in 40 CFR 264.301. The ground-water monitoring program will meet the substantive requirements of 40 CFR 264, Subpart F. The program will include a corrective action component that will be triggered if ground-water protection standards are exceeded at any point of compliance in the monitoring system.

- U.S. EPA requirements for floodplain protection, as described in 40 CFR 6, Appendix A, Statement of Procedures on Floodplain Management and Wetlands Protection. This regulation requires that construction in floodplains be done in such a manner as to minimize harm to the floodplain. Construction within the Scioto River floodplain is unavoidable in implementing a remedial alternative for Bowers Landfill.

- RCRA requirements for construction, operation, and maintainance of hazardous waste landfills in 100-year floodplains. The cover installed during remedial action will be designed and engineered to prevent washout of any hazardous wastes by a 100-year flood, as required by RCRA General Facility Standards in 40 CFR 264.18.

- Maximum Contaminant Levels (MCL) promulgated under the Safe Drinking Water Act. MCLs apply to public drinking water supplies serving 25 or more people. While not applicable to ground water immediately downgradient of Bowers Landfill, MCLs are relevant and appropriate for assessing ground-water contamination levels. Current contaminant levels exceed MCLs in two monitoring wells -- benzene in one well and barium in a second well. However, average ground-water concentrations were well below MCLs. By reducing infiltration of precipitation and flood waters through the landfill, Alternative 4 should eventually reduce contaminant concentrations below the MCLs in all downgradient wells.

- Ohio Water Quality Standards listed in OAC 3745-01. Discharges to the Scioto River from the drainage ditch east of the landfill will be monitored to verify compliance with these standards.

11.3 The Selected Remedy Is Cost-Effective

Alternative 4 represents a cost-effective remedial alternative for Bowers Landfill. This alternative attains the same reductions in current risks from soil ingestion and ground-water ingestion as Alternatives 5 through 8, which are considerably more expensive. Alternative 4 also provides an adequate degree of long-term protection, compared to these more expensive alternatives. Although Alternatives 5 through 8 may offer slightly increased long-term protection, the relative cost increases outweigh the expected benefits. Additional components of these alternatives, such as a gas venting system, leachate collection system, synthetic membrane cap, or flood protection dike, do not increase the effectiveness of these alternatives in proportion to the increased costs. These additional measures are not justified based on current site conditions and contamination levels.

Alternative 4 has a higher cost than Alternatives 3 and 9. However, these alternatives do not achieve either the short-term risk reductions or long-term protection offered by Alternative 4. By providing a degree of protection that cannot be achieved by less costly means, Alternative 4 is cost-effective.

11.4 The Selected Remedy Utilizes Permanent Solutions and Alternate Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

Alternative 4 is not a permanent solution to the public health and environmental problems identified for Bowers Landfill during the RI. It was not technically feasible to develop a permanent remedy for this site for several reasons. First, most of the material in Bowers Landfill consists of general refuse and municipal solid waste. Although the exact amount of hazardous waste placed in the landfill is not known, it is probably a small percentage of the total waste volume. Second, no operating records exist for the landfill. Thus, it is not feasible to identify locations where hazardous wastes might have been placed. Third, the relatively low levels of contamination found during the RI would not be effectively reduced by treatment.

Because the selected alternative is not a permanent solution and will leave wastes in place at the Bowers Landfill, the effectiveness of this remedial action must be reviewed at least once every 5 years.

11.5 The Selected Remedy Reduces Toxicity, Mobility, or Volume of Waste Materials as a Principal Element

Alternative 4 will not reduce the toxicity or volume of contaminants within Bowers Landfill. However, this alternative will reduce the mobility of waste materials within the landfill. The FS report estimates that the low-permeability clay cap included in this alternative will reduce direct infiltration into the landfill surface by over 90 percent. This is much more effective than the current soil and vegetation cover. Reducing the amount of water that contacts waste materials within the landfill should reduce the mobility of these materials and the likelihood of future ground-water contamination.

RESPONSIVENESS SUMMARY
BOWERS LANDFILL
CIRCLEVILLE, OHIO

March 24, 1989

U.S. Environmental Protection Agency

Region V

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Appendix A Written Comments on the Proposed Plan for Bowers Landfill

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RESPONSIVENESS SUMMARY
BOWERS LANDFILL
CIRCLEVILLE, OHIO

1.0 INTRODUCTION

The U.S. Environmental Protection Agency held a public comment period from February 14 to March 16, 1989, to provide interested parties an opportunity to comment on the Agency's Proposed Plan for Bowers Landfill. The purpose of this Responsiveness Summary is to identify major comments raised during the public comment period and to provide U.S. EPA's responses to these comments. U.S. EPA has considered all comments summarized in this document before selecting a remedial alternative for Bowers Landfill.

The Responsiveness Summary includes five sections plus three appendices. Section 2.0 briefly states public reaction to U.S. EPA's Proposed Plan. Section 3.0 contains a brief history of community interest and involvement with the Bowers Landfill site. Section 4.0 summarizes written and oral comments received by U.S. EPA during the public comment period. Comments were received from local citizens, environmental groups, local officials, state officials, and potentially responsible parties. Section 4.0 also includes U.S. EPA's responses to these comments. Section 5.0 identifies and summarizes issues that may continue to be of concern to the community during the design and implementation of U.S. EPA's selected remedy for Bowers Landfill. U.S. EPA will address these concerns during the Remedial Design and Remedial Action (RD/RA) phase of the cleanup process.

The first attachment to the Responsiveness Summary is a list of community relations activities conducted by U.S. EPA at Bowers Landfill, both before and during the public comment period. The second attachment includes copies of all written comments on the Proposed Plan received during the public comment period. Oral comments, which were recorded at a public meeting on February 28, 1989, are included within the transcript for that meeting. The transcript is part of the Administrative Record for Bowers Landfill.

2.0 OVERVIEW

U.S. EPA's preferred alternative for the Bowers Landfill site was presented at the start of the public comment period through distribution of a fact sheet, publication of display advertisement in the Circleville Herald, and placement of the formal Proposed Plan in the site information repositories. The Proposed Plan was also presented and discussed during a public meeting in Circleville on February 28, 1989. The recommended alternative addressed potential ground-water contamination problems near the site, the risk of ingesting contaminated on-site soils, and long-term risks from future contaminant releases.

The preferred alternative specified in the Proposed Plan consists of monitoring ground water at and near the site; restricting the use of the site so that drinking water wells cannot be placed between the site and the Scioto River; placing a 6-foot-high fence around the site perimeter to prevent potential trespassers from entering the site area; and installing a new clay cap on the landfill to minimize the amount of contaminants that could potentially be carried into the ground water beneath the site. Erosion control and drainage improvements would be made, and riprap and sheet piling would be placed on the north and south ends of the landfill to improve flood protection.

The comments received during the comment period indicated that residents have some concerns about U.S. EPA's preferred remedial alternative. Some residents felt additional flood protection measures were needed at the site. Concerns were also raised regarding the proposed ground-water monitoring program and response contingencies. Specific details of such a program are usually resolved in the remedial design phase. Several residents indicated concern that they would have limited future opportunities for input into the cleanup process after the Record of Decision (ROD) is signed. These residents strongly requested the continuation of the Bowers Landfill Information Committee (see Section 3.2).

All written comments received by U.S. EPA are included in Appendix A to this Responsiveness Summary. Verbal comments recorded at the February 28, 1989, public meeting are contained in the transcript of that meeting, which is part of the Administrative Record for Bowers Landfill.

3.0 BACKGROUND ON COMMUNITY INVOLVEMENT

3.1 Early Involvement

Community interest in Bowers Landfill dates back to the early 1960s when residents complained to the Pickaway County Health Department about odors and fires at the landfill. Sporadic complaints from residents continued throughout the 1960s and 1970s.

Local media covered the site during the early 1980s after Superfund was enacted and U.S. EPA became involved at the site. In April 1984, Columbus television station WMCH (Channel 4) mistakenly reported that Bowers Landfill was possibly contaminated with dioxin. The report resulted in increased interest and concern about the site. Since that time, community interest and involvement have been high. This level of interest was maintained during the remedial investigation and feasibility study (RI/FS). Appendix B to this Responsiveness lists community relations activities that U.S. EPA has conducted in response to this interest.

In early 1985, a consent order, allowing the potentially responsible parties to conduct the RI/FS, was drafted. U.S. EPA held a public comment period on the draft consent order and received written and verbal comments covering a wide range of environmental health and public involvement issues. U.S. EPA responded to these comments in July 1985. The document containing these responses (Response to Public Comments on Consent Order for the Bowers Landfill, Circleville, Ohio, July 1985) is included as Appendix C to this Responsiveness Summary.

Many of the comments on the consent order indicated an interest in greater community involvement during RI/FS process. Residents and officials wanted to be kept well informed. Some wanted representation in the decision-making process. In response to these comments, U.S. EPA established the Bowers Landfill Information Committee.

3.2 Bowers Landfill Information Committee

The Bowers Landfill Information Committee was established in November 1985. The committee consisted of representatives from U.S. EPA, OEPA, the PRPs, local (city and county) government, and citizens' groups (ACTION and L-ECHOS). The committee met regularly to discuss progress during the RI/FS and upcoming events. Draft reports were also provided to the committee for review and discussion. Committee meetings were open to any interested observers. Twelve meetings were held between November 1985 and November 1988. The committee had several major functions:

- To disseminate reports, data, and other information related to the Bowers Landfill RI/FS. During the meetings, U.S. EPA, OEPA, and the PRPs made formal presentations to the committee on topics such as well installation and sampling methods; sampling results for soil, ground water, surface water, and sediment; endangerment assessment results; applicable or relevant and appropriate requirements (ARARs); and remedial alternatives developed in the FS.
- To act as liaison between the agencies and the rest of the community.

- To provide input to U.S. EPA and OEPA on issues related to the site. However, the committee was not a decision-making body and had no authority to override agency decisions.

U.S. EPA and OEPA distributed draft versions of several documents to the committee for review and discussion. These documents were generally distributed at least one week (and often earlier) before the committee meeting at which the document was to be discussed. Site reports reviewed and discussed by the committee included:

- Work Plan
- Site Safety Plan
- Biological Survey Report
- RI Report
- Endangerment Assessment Report
- FS Report
- QA/QC Plan
- Geophysical Survey Report
- Technical Memoranda for Sampling Results
- Alternatives Array Document

3.3 Concerns Raised During the RI/FS

The following community concerns were raised during the RI/FS. Many of these concerns were expressed by the members of the Bowers Landfill Information Committee.

1. Concerns were raised by the information committee about the health and safety aspects of the RI field work. The concerns regarded coordination between agencies, PRPs, and local emergency officials should an emergency occur.

   U.S. EPA Response: U.S. EPA and OEPA officials met with local fire, police, hospital, and other officials to explain the roles of the RI participants and to better understand the jurisdictions and response capabilities of the local agencies. Response plans were developed for the unlikely event of an emergency.

2. Members of the information committee expressed a desire to physically observe on-site field activities.

   U.S. EPA Response: Due to liability concerns, this request was denied. However, slides taken during RI field activities were shown at information committee meetings.

3. Residents expressed concern that the site should be fenced to restrict site access during RI field activities.

U.S. EPA Response: The U.S. EPA Emergency Response Team evaluated Bowers Landfill in May 1985 to determine whether site access posed an immediate health threat. U.S. EPA determined that a fence was not necessary because the only unnatural materials observed at the site were empty drums and plastic nonhazardous materials. The site was almost completely covered by vegetation (grasses, shrubs, and trees). However, as a result of this evaluation, U.S. EPA installed additional warning signs at the site, particularly near the southernmost access point along Island Road.

Before the start of RI field work, a fenced area was constructed near the entrance to the landfill. Equipment used during field activities was stored inside this fenced area when not in use. The area also contained a support trailer for field activities.

4. Concerns were raised regarding the differences between the RI results and the results obtained by Burgess and Niple in 1981.

U.S. EPA Response: U.S. EPA believes that the data obtained during the RI most accurately represents current conditions at and near the landfill. The agency also feels that the level of data quality assurance in 1981 was not as high as is present quality assurance programs offer. Therefore, the 1981 results may be less reliable than the RI results. The differences between current and 1981 results may also be explained by changes in contaminant levels due to flooding at the site or volatilization of the chemicals. Chemicals that migrated to the Scioto River would have been diluted to much lower concentrations. This issue is addressed in greater detail in Section 4.7 of this Responsiveness Summary.

5. U.S. EPA was requested to provide the results of private well sampling to the appropriate homeowners.

U.S. EPA Response: U.S. EPA provided the results of water testing to the appropriate homeowners. The results were sent to the information repository and are also included in the RI and EA reports.

6. Residents were concerned that the Circleville water supply might be contaminated.

U.S. EPA Response: OEPA, a party to the consent order, responded that the City of Circleville must periodically test its water supply for the presence of hazardous chemicals. OEPA placed copies of test results from 1980-1987 in the information repository.

Summaries of these test results are also included in the EA report. The results indicate that the Circleville water supply is of high quality and has not been adversely affected by contamination from Bowers Landfill. This issue is discussed further in Sections 4.2, 4.6, and 4.7 of this Responsiveness Summary.

7. Members of the group ACTION requested a formal 90-day public comment period on the RI report.

U.S. EPA Response: While a formal comment period on the Bowers Landfill RI report was not held, U.S. EPA pointed out that citizens may comment on technical activities at any time during the RI/FS process. Any comments would be included in the Bowers Landfill Administrative Record. In addition, comments on the RI submitted to U.S. EPA by members of Bowers Landfill Information Committee were included as an addendum to the RI report. A major function of the information committee has been to provide opportunities for citizen input during the technical activities at the site, particularly during the development of the work plan, and during the review of the RI, EA, and FS reports.

4.0 SUMMARY OF PUBLIC COMMENTS AND AGENCY RESPONSES

This section of the Responsiveness Summary summarizes comments received during the public comment period for Bowers Landfill and provides U.S. EPA's responses to these comments. The Agency received comments from local citizens, environmental groups, local officials, state officials, and potentially responsible parties. These comments concerned the preferred remedial alternative (Alternative 4), as stated in the Proposed Plan, and other remedial alternatives developed in the Feasibility Study (FS). U.S. EPA also received comments on work conducted earlier in the RI/FS process, including the RI and endangerment assessment.

Attachment 2 to this Responsiveness Summary includes copies of all written comments received during the public comment period. Oral comments, which were recorded at a public meeting on February 28, 1989, are included within the transcript for that meeting. The transcript is part of the Administrative Record for Bowers Landfill. Where several individuals or organizations submitted similar comments, a single response is provided. U.S. EPA has grouped the comments according to subject.

4.1 Remedial Alternative Preferences

1. Two residents asked why a flood protection dike was not included as part of the preferred remedial alternative.

   U.S. EPA Response: Based on discussions with the U.S. Army Corps of Engineers, U.S. EPA believes that the landfill cap installed under Alternative 4 can be designed and constructed to resist flood damage or washout of wastes by a 100-year flood. Alternative 4 would include flood protection, in the form of riprap, on the ends of the landfill most prone to flood damage. Where necessary, sheet piling would be added to provide additional stability. Landfill side slopes would be designed to prevent failure during flood conditions. A safe horizontal-to-vertical ratio for the side slopes would be determined by geotechnical studies of the landfill surface and the soil and clay used for the cover. Wastes would be covered by at least 4 feet of new cover material and would be isolated from flood waters. Any minor damage to the cap caused by flooding would be repaired promptly as part of an ongoing operation and maintenance program.

   The additional protection offered by the flood dike is not proportional to the cost of the dike. Although the dike would provide additional long-term protection from floods, it would provide no additional reduction in infiltration of precipitation through the landfill, compared to the clay cap. The FS estimates the cost of the flood protection dike as approximately $5.5 million. This additional component would more than double the cost of Alternative 4 while providing only slightly increased long-term effectiveness.

   Further, construction of the dike would remove approximately 80 acres of land from the 100-year floodplain of the Scioto River, since the dike would prevent floodwaters from covering this area. This would increase the height of floodwaters upstream and downstream of the landfill and may cause additional areas to flood.

2. Several residents wanted to know why hazardous waste landfill closure requirements were not applied to Bowers Landfill. A citizen representing ACTION, a local environmental group, asked: "The feasibility study states that Alternative 4 would comply with current State of Ohio closure standards for solid waste landfills. Since hazardous waste was dumped at Bowers, I would like to know if any of the alternatives comply with State of Ohio closure standards for hazardous waste facilities. If not, why not?"

U.S. EPA Response: Ohio hazardous waste regulations are modeled after U.S. EPA hazardous waste regulations. The Resource Conservation Recovery Act (RCRA), as amended by the 1986 Hazardous and Solid Waste Amendments, regulates active hazardous waste facilities. Hazardous waste facilities that were not operating after November 19, 1980, are not required to comply with RCRA. Because of this, RCRA is not applicable to remedial actions at Bowers Landfill.

U.S. EPA believes that site conditions, as currently defined by the RI, do not justify closure of Bowers Landfill in compliance with state or federal regulations for active hazardous waste landfills. The landfill was used primarily for domestic waste, nonhazardous industrial waste, and construction debris. Based on site conditions and the relatively low levels of contaminants in ground water, closure as a hazardous waste landfill is not justified.

Nevertheless, the remedial alternative chosen for Bowers Landfill takes into account several RCRA requirements for hazardous waste landfills. The low-permeability clay layer installed over the landfill will have a maximum permeability of 10^{-7} cm/sec. This cover would meet RCRA requirements for the clay liner at the bottom of a hazardous waste landfill, as described in 40 CFR 264.301. In addition, the cover will meet RCRA General Facility Standards in 40 CFR 264.18. The cover will be constructed, operated, and maintained to prevent washout of hazardous wastes by a 100-year flood. Finally, the long-term monitoring program for Bowers Landfill will comply with the substantive requirements for ground-water monitoring under RCRA in 40 CFR Subpart F.

3. Members of ACTION expressed concern that "containment techniques are unproven and unreliable technologies with specific implementation problems." Concerns were raised that containment remedies depend on expert installation, and even if properly installed, clay or synthetic membrane caps will eventually leak.

U.S. EPA Response: Capping, with either clay or synthetic membrane layers, is a standard procedure for closing land disposal units that have reached capacity. The cap serves two main purposes -- preventing direct contact and exposure to waste materials and preventing ground-water contamination by reducing infiltration of water through the wastes. The low-permeability clay cap proposed for Bowers Landfill will serve both purposes. The cap will prevent direct contact with and ingestion of contaminated soils.

The clay layer of the cap will have a permeability of 10^{-7} cm/sec or less and should reduce infiltration of precipitation and floodwaters to less than 10 percent.

U.S. EPA will take several measures to increase the effectiveness of the cap and reduce the likelihood of cap failure. First, the clay layer will be designed and installed under a strict quality assurance program. The clay will be installed in 6-inch increments (or lifts). Each lift will be compacted and tested for permeability before the next lift is added. Second, the horizontal-to-vertical ratio of the side slopes will be designed to prevent failure during worst case flooding conditions. Third, the cap will be inspected and maintained according to a regular schedule, with additional inspections scheduled after floods. If the cap leaks even after these precautionary measures are taken, the long-term ground-water monitoring program, included as part of remedial action, will detect increases in ground-water contamination before the contamination moves off-site.

4. Several residents were concerned that treatment technologies were not considered for Bowers Landfill.

U.S. EPA Response: Treatment technologies were considered in the FS, but were screened out due to effectiveness, implementability, and cost considerations. Thus, treatment technologies were not included in any of the remedial alternatives evaluated in detail. The Superfund Amendments and Reauthorization Act (SARA) of 1986 expresses a preference for remedial alternatives that include treatment as a principle element. However, treatment is not always practical, especially at sites that have large volumes of low-concentration waste materials.

Three specific factors make treatment impractical at Bowers Landfill. First, much of the estimated 130,000 cubic yards of waste material in the landfill consists of general refuse and municipal solid waste, rather than hazardous waste. Second, no operating records exist, so it is not possible to identify specific locations along the 4000-foot length where hazardous wastes may have been deposited. Third, the relatively low levels of contamination found during the RI would not be effectively reduced by treatment.

5. The potentially responsible parties commented that Alternative 3 (limited repairs to landfill cover) was adequately protective of public health and the environment, and that the selection of Alternative 4 (clay cover over the landfill) was not warranted.

U.S. EPA Response: U.S. EPA's rationale for selecting Alternative 4 over Alternative 3 is clearly stated in the ROD Decision Summary. Briefly, Alternative 3 does not meet the two threshold criteria for selection as a remedial alternative. Alternative 3 does not provide adequate protection of human health and the environment and does not comply with ARARs.

6. One resident stated that cost should not be a factor in choosing a remedial alternative for Bowers Landfill. He felt that the most expensive technologies should be chosen because they are the most protective. He stated that "EPA's rightful job at this point is to cleanup the Bowers site to the best of its ability, notwithstanding cost." This resident believed that the remedial alternative should include a synthetic membrane cover for the landfill, construction of the most sophisticated drainage system possible, and construction of a flood control dike.

U.S. EPA Response: SARA specifically requires U.S. EPA to select remedial actions that are cost-effective. Cost-effectiveness cannot be used to justify the selection of a nonprotective remedy. However, U.S. EPA is required by law to closely evaluate the costs required to implement and maintain a remedy and to select a protective remedy whose costs are proportionate to its overall effectiveness.

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) provides the regulatory framework for Superfund. Under the currently proposed revisions to the NCP, cost is one of five primary balancing criteria for evaluating remedial alternatives. Other balancing criteria include long-term effectiveness; reduction of toxicity, mobility, or volume; short-term effectiveness; and implementability. To select a remedial alternative, U.S. EPA must first determine that the alternative meets the two threshold criteria -- the alternative must adequately protect human health and the environment and the alternative must comply with applicable or relevant and appropriate requirements (ARARs). U.S. EPA must then consider the balancing criteria and choose the remedial alternative that represents the best combination of these criteria. Thus, U.S. EPA must consider cost in this analysis.

7. One member of ACTION stated that a fence around Bowers Landfill, a component of U.S. EPA's preferred alternative, should be erected as soon as possible. This measure would limit exposure primarily to those who choose to become exposed.

U.S. EPA Response: U.S. EPA agrees that installing a fence around Bowers Landfill will limit exposure to those who choose to become exposed. Fencing was included in all remedial alternatives (except No Action) evaluated during the FS. Fencing will be implemented on a priority basis once remedial action begins.

4.2 Technical Concerns Regarding Remedial Alternatives

1. One member of ACTION, a local environmental group, asked about maintenance procedures for the preferred alternative. He stated that the feasibility study report did not adequately describe maintenance procedures.

U.S. EPA Response: The February 3, 1989, draft of the Feasibility Study Report, page 4-25, states:

> Maintenance of the cover would involve mowing the vegetation, inspecting the surface for cracks, settlement, and ponding of water, and making appropriate repairs. Maintenance requirements for the cover can be expected to be greater than the present cover after flood events due to the limited subsurface stabilizing capability of the grass. Damage to the cap could occur from erosion, from plant roots breaking through the surface, from subsidence due to decaying roots, from penetration by burrowing animals, or from vandalism. Direct exposure to wastes as a result of damage is unlikely because waste materials would be isolated at least 4 feet below the surface. If repairs to the clay or reseeding were required, this would be carried out immediately. Repairs to the clay would consist of patching with fresh clay.
>
> The minimum effective design life of caps is generally 20 years (K. Wagner et al, Remedial Action Technology for Waste Disposal Sites, Noyes Data Corporation, Park Ridge, N.J, 1986, pp. 19 et seq.). Proper maintenance can maintain the former effectiveness. If well maintained, there would be virtually no long-term threat to public health or the environment.
>
> The maintenance program would also include inspection of the cover for structural integrity on a regularly scheduled basis. Following periods of flooding, the landfill cover would be inspected for signs of erosion and repaired as necessary. This program would include repair of riprap protection, as necessary, and inspection for damage from scouring, wave action, and debris, together with repair as necessary.

U.S. EPA believes that the intent of the maintenance program is clearly stated in the above text. The purpose of a feasibility study (FS) is to provide a general description of remedial action technologies and to summarize the implementation methods. Specific operational guidelines that would include inspection logs, inspection schedules, inspection methods, and descriptions of corrective actions will be detailed in the remedial design (RD). The RD is intended to be a blueprint for implementation while the FS is a broader conceptual study of remedial options for the site.

2. Several residents, ACTION, the Circleville City Council, and the City of Circleville Water Department expressed concerns about long-term ground-water monitoring at the site. These concerns are related to protection of the city's water supply, which is obtained from a wellfield approximately 1½ miles south of the landfill. Specifically, commenters requested that new monitoring wells be installed between the landfill and the city's wells. Commenters also wanted to know how the proposed monitoring program would detect and prevent off-site migration of ground-water contamination. Finally, some commenters felt that testing of private wells south of the landfill and testing of the city's wells should also be included in the monitoring program.

U.S. EPA Response: Long-term ground-water monitoring will be conducted at Bowers Landfill as part of the remedial alternative. As noted above, the monitoring program will be based on RCRA ground-water monitoring requirements for active hazardous waste facilities. The monitoring program will include installing additional monitoring wells south of Bowers Landfill (between the landfill and the Circleville municipal wellfield) and west of the landfill (between the landfill and the Scioto River). The program may also include sampling of private residential wells south of the site.

Testing of the city's wells is required by federal law. Testing was conducted quarterly during 1988 for a large list of volatile organic compounds (VOCs), including eight VOCs for which there are federal drinking water standards. None of these VOCs were detected in samples from the Circleville wells. In addition, none of the VOCs found in ground-water samples from Bowers Landfill were found in the Circleville water supply. After reviewing the quarterly sampling results for 1988, OEPA informed the City that "no repeat monitoring schedule has been established by the Ohio Environmental Protection Agency (Ohio EPA) but, it is anticipated that the submittal of quarterly VOC samples will be required again in 1991."

U.S. EPA believes that the combination of these two programs (long-term ground-water monitoring at Bowers Landfill plus testing of the Circleville water supply by the City of Circleville) will result in monitoring that is protective of human health and the environment and sufficient to identify any future releases to ground water from the landfill.

3. Several residents requested that U.S. EPA provide additional details about the proposed ground-water monitoring program (for example, number and locations of wells sampled, frequency of sampling, and chemicals measured).

U.S. EPA Response: As noted above, ground-water monitoring will require regular and systematic sampling. The monitoring program will meet the substantive requirements for ground-water monitoring under the Resource Conservation and Recovery Act (RCRA) as described in 40 CFR Subpart F.

The installation of three additional ground-water monitoring well clusters is necessary to develop a ground-water monitoring program that will adequately detect potential future releases of contaminants. These clusters will consist of three wells -- a shallow well located in the upper portion of the upper aquifer, an intermediate well located between the water table and the bedrock, and a deep well located just above the bedrock. Two well clusters will be installed west of the landfill, one cluster between well location 5 and well location 6 and the other between well W-10 and the bend of the landfill. The third well cluster will be installed off-site between the landfill and the Circleville municipal wellfield. The installation of additional well clusters may also be considered.

The monitoring wells will be sampled bimonthly for the first year and quarterly for years 2 through 4. During the first year, samples will be analyzed for the full Target Compound List (TCL). A reduced TCL may be considered after the first year. If ground-water contaminant levels do not increase over this 4-year period, the sampling schedule will be reevaluated and the frequency of sampling may be reduced.

4. Several residents requested additional information on the steps U.S. EPA would take if long-term monitoring results showed increases in ground-water contaminant levels.

U.S. EPA Response: The monitoring proposed as part of the remedial alternative for Bowers Landfill will be designed to detect increases in ground-water contaminant concentrations due to the landfill. A statistical test will be developed to determine when a significant increase in ground-water contamination has occurred.

Should a significant increase in the levels of contaminants occur, the increase will automatically trigger a RCRA corrective action. If the levels of contaminants in ground water exceed MCLs, where available, or health-based levels, where MCLs are not available, resampling will occur within 14 days. (Health-based levels are concentrations corresponding to a cancer risk of 10^{-6} for carcinogenic contaminants and a hazard index (HI) greater than 1 for noncarcinogenic contaminants.) If the resampling verifies that there has been a significant increase in contaminant levels, a corrective action program will be implemented. Corrective action may include such measures as establishing alternate concentration limits (ACLs), collecting and treating ground water, or removing the source of contamination.

U.S. EPA will make every effort to minimize delays, should corrective action be needed in the future at Bowers Landfill. Details on the scheduling, timing, and nature of possible corrective actions will be addressed during remedial design.

5. One resident wanted to know the estimated costs for excavating the landfill.

U.S. EPA Response: Excavation costs at hazardous waste sites vary according to the type of excavation equipment used, levels of worker protection required, and other site-specific factors. However, a typical cost estimate for excavation in Level B protection is approximately $60 per cubic yard. Using this figure, the total cost to excavate all of the estimated 130,000 cubic yards of waste in Bowers Landfill would be approximately $8 million. This estimate does not include additional costs for removing excavated wastes from the site, packing the wastes for removal, or treating the wastes.

6. Several residents expressed concerns that while a clay cap would reduce infiltration through the top of the landfill, leakage was more likely to occur through the bottom. Because no borings were drilled through the landfill, U.S. EPA cannot be sure that there is an adequate confining layer below the wastes.

U.S. EPA Response: An 8- to 15-foot-thick layer of silt or clay was observed at all borings completed adjacent to the landfill. These borings indicated that a natural layer of low-permeability material was present at the time of landfill construction. Information available to U.S. EPA indicates that most waste materials were deposited directly on this layer, although some portions of this layer may have been excavated during landfilling activities.

Because Bowers Landfill does not have an engineered liner below the wastes, there is a potential for leaching from the bottom of the landfill. However, the major driving force in producing leachate is infiltration of water. The low-permeability clay cap (10^{-7} cm/sec or less) will greatly reduce the infiltration of both precipitation and floodwaters that might create leachate. Another factor that U.S. EPA considered was that leachate, when generated, would first enter the upper portion of the aquifer downgradient of the landfill. Ground-water testing during the RI showed that contaminant levels in this aquifer were very low and did not identify a leachate plume.

For these reasons, U.S. EPA believes that capping should be the first step in lessening the potential for leachate production. Capping will be coupled with frequent monitoring for hazardous constituents in site ground water. Should further ground-water testing identify leachate as a problem, then source reduction techniques, such as leachate collection and treatment, will be implemented as part of a corrective action program.

7. One member of ACTION felt that U.S. EPA's preferred remedial alternative was "the equivalent of doing nothing while waiting for rainfall and floods to flush the contaminants into the surface and groundwater."

U.S. EPA Response: As discussed in the previous response, U.S. EPA believes that the remedial alternative selected for Bowers Landfill represents an active measure to contain contaminants within the landfill, rather than allowing these contaminants to be flushed out by rainfall and floods.

8. One resident asked under "what circumstances have gas venting and leachate collection systems been recommended and how do these circumstances differ from the Bowers Site?"

U.S. EPA Response: Gas can be generated within a landfill by microbial degradation of organic materials or by volatilization of organic liquids. The period of active gas generation within a landfill can vary widely depending on site-specific conditions such as temperature, pH, moisture content of the refuse, oxygen content, and refuse composition.

In the absence of a low-permeability layer above the waste materials, most landfill gases will escape through the top of the landfill. This is most likely the case with Bowers Landfill. Wastes have been in place from 20 to 30 years and are covered with a thin layer of highly permeable soil. Further, because wastes were piled on the ground, rather than placed in the ground, the landfill has a large surface area (relative to the waste volume) for gases to escape. These observations, plus the low organic vapor concentrations measured during the RI, suggest that Bowers Landfill is not actively generating significant quantities of gas.

Gas collection and venting systems are normally installed when landfills actively generating gas are capped with low-permeability materials. Capping prevents gases from escaping through the top of the landfill and forces the gases to move more slowly in a lateral direction. Typically, collection systems are installed at the perimeter of the landfill to prevent gases from migrating off-site. However, collection systems can also be installed in the interior of the landfill. Because Bowers Landfill does not appear to be actively generating gas, a gas collection system was not included as part of the selected remedial alternative.

Leachate collection systems are required for new hazardous waste landfills as part of the bottom liner. These systems collect and drain leachate, preventing the leachate from reaching the bottom liner, penetrating the liner, and contaminating ground water below the landfill. Such a system cannot be constructed under the wastes already in Bowers Landfill.

The leachate collection system proposed for Bowers Landfill in the FS report differs from this design and would be much less effective. The leachate collection system would consist of a 1-foot-thick drainage layer of high-permeability sand and gravel. This layer would be placed on the landfill surface, before the clay cap is applied. At the edges of the landfill, where this drainage layer meets the existing land surface, a 2-foot deep trench would be dug. The drainage layer would extend into this trench.

This type of a leachate collection system would collect most of the precipitation and floodwater that passed through the landfill cap. However, only a small fraction of this water would infiltrate the low-permeability cap. The collection system would not extend down to the water table and would not collect ground water moving away from the landfill. Thus, U.S. EPA has determined that the addition of a leachate collection system would only marginally increase the effectiveness of the landfill cap.

9. One resident commented that U.S. EPA's proposed plan "fails to address the fact that a large diameter natural gas transmission line crosses the northeast corner of the site."

U.S. EPA Response: U.S. EPA is aware of this gas transmission line. However, the Agency does not believe that the presence of this line will interfere with remedial construction activities. U.S. EPA will review this issue further during remedial design. Prior to construction, U.S. EPA will conduct a field survey to confirm the actual location of the gas transmission line, as well as other underground utilities that might be present.

10. The City of Circleville commented that "both the sheetpiling protection and the amount of riprap to be installed is not sufficient given the fact that during severe floods the entire north leg of the landfill is at risk." The City also commented that "sheetpiling needs to be installed" at the south end of the landfill "to prevent undermining of the riprap in this area and the riprap itself needs to be extended considerably."

U.S. EPA Response: U.S. EPA will consider the need to extend erosion protection in greater detail during remedial design. Appendix D of the FS report contains a preliminary erosion protection analysis. This analysis identifies several areas (including those identified by the City of Circleville) that may require erosion protection beyond that included in the conceptual design of the remedial alternative. A more detailed erosion protection analysis will be conducted prior to designing and constructing the erosions protection system for the landfill cap.

4.3 Public Participation Process

1. Several residents requested that the Bowers Landfill Information Committee, which met regularly during the RI/FS process, be continued during design and implementation of the remedial alternative selected for Bowers Landfill.

U.S. EPA Response: U.S. EPA plans to continue the Bowers Landfill Information Committee during remedial design and remedial action (RD/RA). However, the makeup of the committee will vary depending on how design and construction is conducted. Three possible options are:

- Federal-lead, with the RD/RA conducted by the U.S. Army Corps of Engineers or by a U.S. EPA contractor
- PRP-lead, with the RD/RA conducted by the potentially responsible parties (PRPs) under a Consent Decree
- PRP-lead, with the RD/RA conducted by the PRPs under a Unilateral Order

Under the second and third options, U.S. EPA would oversee the RD/RA. The format of the Information Committee will be determined by the option that is chosen. U.S. EPA expects this to occur during the summer or fall of 1989.

2. One resident expressed concern that the public comment period of 30 days was not adequate and that additional time was needed for the public to review and comment on U.S. EPA's proposed plan.

U.S. EPA Response: U.S. EPA believes that a 30-day public comment period on the proposed plan is sufficient for Bowers Landfill due to the long-term involvement of citizens and citizens' groups in the RI/FS process. The public comment period began on February 14, 1989, shortly after the release of the Proposed Plan, and extended to March 16, 1989. Most of the comments received by U.S. EPA have come from individuals and organizations that have attended the Information Committee meetings, commented throughout the RI/FS, and been kept abreast of technical issues concerning Bowers Landfill.

U.S. EPA offers the following information to support the adequacy of a 30-day comment period. The Agency conducted an extensive community relations program in conjunction with the RI/FS. This program included 12 meetings of the Bowers Landfill Information Committee, where U.S. EPA, OEPA, technical representatives of the PRPs, local government officials, and citizens' groups met to keep the public informed of progress during the RI/FS. During all of these meetings, individuals from the community were allowed to ask questions through representatives on the Bowers Landfill Information Committee. U.S. EPA has responded to these questions and concerns on an ongoing basis. A draft of the FS, on which U.S. EPA based its selection of a remedial alternative, was released to the Information Committee in September 1988. Results of the FS were discussed at a committee meeting in November 1988, several months before the Proposed Plan was released.

3. One resident expressed concern that the public comment period did not offer the Circleville community "a genuine opportunity to change the EPA's position."

U.S. EPA Response: As noted above, the public has been actively involved in all aspects of the RI/FS process. U.S. EPA has received a number of comments and has seriously considered these comments. Several comments have resulted in minor changes to the preferred remedial alternative. These changes include:

- Expanding proposed ground-water monitoring at Bowers Landfill to meet the substantive requirements of RCRA.

- Installing additional monitoring wells south and west of Bowers Landfill and possible inclusion of residential wells as part of the long-term monitoring program.

- Including surface water monitoring as part of the long-term monitoring program to verify that the landfill is not affecting the Scioto River via surface water discharges.

- Lowering the permeability of the clay layer of the landfill cover to 10^{-7} cm/sec. This revised permeability is based on requirements for clay layers installed as components of RCRA landfill liners.

4.4 Costs And Funding Issues

1. Local residents expressed concern about the liability of potentially responsible parties (PRPs) for implementation, monitoring, and maintenance of remedial actions at Bowers Landfill. Specifically, residents wanted to know how this liability would be transferred if PRPs were acquired by other companies or filed for bankruptcy.

   U.S. EPA Response: Superfund liabilities are treated in much the same way as any other corporate liability. If a company with liability for a hazardous waste cleanup is sold, the buyer may or may not agree to take on the seller's liability. The debt, however, is not extinguished by the transfer of other assets. Similarly, a restructuring does not release a company from liability.

   Bankruptcy may relieve a company or individual of certain debts. Debts owed to the federal government for costs incurred during the cleanup of hazardous waste sites, however, are given a high priority among bankruptcy claims. Any funds not recoverable from the PRPs, for cleanup or operation and maintenance, would be provided from Superfund monies or by the State of Ohio.

2. A Pickaway County Commissioner expressed concern that the county did not have the funding to pay for remedial action at Bowers Landfill.

   U.S. EPA Response: U.S. EPA does not consider Pickaway County to be a PRP for Bowers Landfill at this time. If the county is not a PRP, it will not be required to fund any portion of remedial action costs.

3. One member of ACTION wanted to know who would be financially responsible should the chosen remedial alternative eventually fail.

U.S. EPA Response: The potentially responsible parties (PRPs) for Bowers Landfill would most likely be financially responsible should the chosen remedial alternative eventually fail. Section 122(f) of the Superfund Amendments and Reauthorization Act (SARA) allows U.S. EPA to grant PRPs a release from future liability at the completion of remedial action. In granting such a release, U.S. EPA would consider such factors as the effectiveness and reliability of the remedial action, the nature of remaining risks, and the extent to which the remedial action represents a permanent remedy for the site. Because the remedial action for Bowers Landfill is not a permanent remedy and leaves wastes in place, U.S. EPA would not likely grant a release from liability.

4. One member of ACTION stated that cost estimates in the FS "do not take into account the potential for astronomical increases when these impermanent remedies eventually fail."

U.S. EPA Response: The purpose of the RI/FS is to study current conditions of a hazardous waste site, to evaluate the potential effects of contaminant releases from the site, and then to propose remedial alternatives for the site that protect human health and environment. While conditions may change in the future, the purpose of the RI/FS process is to select a remedial alternative that will succeed in providing long-term protection, rather than a remedy designed to fail. Thus, the use of theoretical future conditions as a basis for estimating costs of remedial alternatives is not the intent of Superfund.

4.5 Enforcement Issues

1. One member of ACTION expressed concern that the potentially responsible parties were allowed to write the feasibility study for Bowers Landfill.

U.S. EPA Response: Section 104(a) of SARA gives U.S. EPA the authority to allow PRPs to conduct a remedial investigation and feasibility study (1) if the PRPs demonstrate their qualifications to do the work and (2) if U.S. EPA oversees and reviews the work. By allowing the PRPs to conduct the RI/FS at their own expense, U.S. EPA is able to save Superfund monies for sites where no PRPs can be identified.

The Bowers Landfill RI/FS was conducted under such an arrangement. In 1985, U.S. EPA and OEPA signed a Consent Order with E.I. DuPont deNemours & Company (DuPont) and PPG Industries, Inc. (PPG), two of the PRPs. While Dupont and PPG conducted the RI/FS, all phases of the work were reviewed and overseen by U.S. EPA and OEPA.

4.6 Remedial Investigation Issues

1. Several residents expressed concern about the adequacy of the source investigation. Specifically, they wanted to know why the amounts and locations of hazardous wastes in Bowers Landfill remain unknown. Without this information, U.S. EPA does not have the technical data to support its choice of a remedial alternative.

U.S. EPA Response: U.S. EPA believes that data in the RI and EA reports adequately support the choice of a remedial alternative for Bowers Landfill. During the RI, a large number of samples were collected from soil, sediment, surface water, and ground water directly adjacent to the landfill. The results of all samples indicated relatively low levels of contamination, and no clearly identifiable "hot spots." Sampling results from this first phase of the RI indicated minimal migration of contaminants from the landfill. Thus, U.S. EPA determined that a second phase of the RI, which would involve collecting samples of landfilled material, was not warranted.

U.S. EPA used a variety of sources, other than sampling, to obtain information about wastes disposed of in Bowers Landfill. These sources included historical aerial photographs, information from OEPA files, information provided by PRPs, and interviews with former owners, operators, and users of the landfill. A complete inventory of materials deposited in the landfill cannot be prepared because accurate, documented records of landfilling activities do not exist. Additionally, interviews with former owners, operators, and users were conducted 15 to 20 years after landfilling ended. Thus, the information obtained from these interviews may not be completely accurate.

Persons interviewed stated that Bowers Landfill accepted industrial wastes, including barrels containing liquids and liquids from tank trucks. Some of these liquids may have been hazardous substances. Nevertheless, much of the industrial waste accepted by Bowers Landfill consisted of general trash and other nonhazardous wastes. Information from OEPA files (formerly the Ohio Department of Health) states that the majority of materials placed in the landfill consist of residential wastes collected by private haulers in the Circleville area.

In response to a 1978 investigation by the U.S. House of Representatives Subcommittee on Oversight and Investigation, DuPont and PPG reported disposal of 6,000 and 1,700 tons of waste, respectively, in Bowers Landfill between 1965 and 1968. U.S. EPA requested additional information from DuPont and PPG in 1988 under Section 104(e) of CERCLA. Both companies stated that they did not retain waste shipment records from the 1960s and that previous estimates of waste volumes represented the best information available. Each company interviewed employees who worked at the Circleville plants during the 1960s to obtain additional information on waste disposal from that period. DuPont stated that most of the 6,000 tons of wastes sent to Bowers Landfill consisted of Mylar polyester film. PPG responded that wastes sent to Bowers Landfill may have included defective resin products, used filter materials, resin-saturated phosphate salts, spent cleaning materials, and caustic solutions.

2. U.S. EPA received several questions and comments related to the potential migration of ground-water contamination south of Bowers Landfill. These comments included statements by several members of ACTION that one reason for the difference between RI/FS results and the 1981 findings of Burgess and Niple may, in part, be the off-site migration of a contaminant plume to the south. Since the City of Circleville's water supply wells are located 1½ miles south of the landfill, residents were concerned about this possibility. Residents were particularly concerned with movement of water in the lower aquifer at the site, and suggested that it is unlikely that water from this aquifer discharges upward into the Scioto River.

U.S. EPA Response: The RI investigated two water bearing aquifers below the site. These two units are separated west of the landfill by a low-permeability layer. Ground water in the upper aquifer flows west toward the Scioto River and probably discharges into the river. Ground water in the lower aquifer flows southwest toward the river. The potentiometric surface (the level to which the water will rise) of the lower aquifer is higher than that of the upper aquifer and about the same as the water level in the Scioto River. Thus, ground water in the lower aquifer may move upward toward the river. However, the low-permeability layer that separates the two aquifers may underlie the river and restrict upward movement of ground water into the river. In this case, ground water from the lower aquifer will continue to move southwest. This ground water may eventually flow southward along the Scioto River, which is likely a ground-water divide. If the low-permeability layer is not continuous, ground water in the lower aquifer would likely discharge upward into the Scioto River.

Circleville's water supply comes from a wellfield, located 1½ miles south of Bowers Landfill. A number of private wells and the Sturm and Dillard quarry are located between the site and the city's water supply. Two private wells, located between the site and the quarry, were sampled during the RI. No contamination was detected in these wells. These wells and four additional wells, including three wells at the Sturm and Dillard quarry, were sampled during the 1981 Burgess and Niple study. Although the validity of the Burgess and Niple data is not completely known, no organic contaminants were detected in samples from these wells. In addition, the City of Circleville has analyzed samples from its drinking water supply wells from 1980 to the present. These results were reviewed as part of the EA. None of the results indicate that Bowers Landfill has impacted the city's water supply.

3. One member of ACTION stated that the remedial investigation was conducted "in the middle of the worst drought to affect this area in the past 60 years." He felt that these conditions could have affected the results and conclusions of the RI.

U.S. EPA Response: Climatological data from the Circleville area does not support this statement. Data from the National Weather Service in Columbus, Ohio, approximately 25 miles north of Bowers Landfill, indicate an average annual precipitation of approximately 36.97 inches. For the years 1985 through 1988, annual precipitation at Columbus was 38.67, 35.04, 26.70, and 36.57 inches, respectively. These data do not suggest extreme drought conditions, and, with the exception of 1987, precipitation in the area near Bowers Landfill was near average values.

The first round of ground-water, surface water, and sediment sampling was conducted in February 1987; the second round was conducted in April and May 1987; and the supplemental round was conducted in March 1988. None of these events occurred following periods of abnormally low precipitation. The first round of sampling actually followed a period of relatively high precipitation, as the landfill was flooded in December 1986. Additional information on precipitation and river stage data during sampling events is presented in Drawings 3-15 and 3-16 of the RI report.

4. One resident asked why the ground-water study during remedial investigation was confined to the site vicinity and did not study regional ground-water flow. Residents also asked why the remedial investigation did not include (1) testing of wells south of Bowers Landfill and (2) installation and testing of wells on the west side of the Scioto River.

U.S. EPA Response: The RI was not strictly limited to studying the site. Off-site residential wells, including two wells south of Bowers Landfill (between the landfill and the City of Circleville water supply), were sampled. Samples from these wells, as well as samples from ground-water monitoring wells, showed very little contamination. As a result, the monitoring well network was not extended south or west during the RI.

U.S. EPA will extend the monitoring well network as part of the remedial action for Bowers Landfill. The extended network will include additional monitoring wells south of the landfill, additional wells between the landfill and the Scioto River, and, if necessary, additional wells west of the river.

5. One member of ACTION questioned a statement in the RI report about potential sources of tetrachloroethene in an upgradient monitoring well.

U.S. EPA Response: Tetrachloroethene was found in two ground-water samples collected from upgradient well W-12. Contaminants found in this well are not likely to have been caused by the landfill. The RI report (page 5-8) speculated that the tetrachloroethene found in these samples may have originated from equipment maintenance activities associated with the nearby sand and gravel quarrying operations. Tetrachloroethene is a common solvent and is widely used as a degreaser for metal machine parts.

6. One member of ACTION asked why the RI report did "not speculate what will happen to groundwater flow and the contaminants the water contains should adjacent quarrying operations reach below the water table as they have south of the site."

U.S. EPA Response: U.S. EPA does not believe that quarrying activities near Bowers Landfill are likely to affect regional ground-water flow. Quarrying activities are continuing east and northeast of the site. At the time of the RI, these quarrying activities had reached the water table northeast of the landfill. Potentiometric surface maps of the upper aquifer indicate that flow is west toward the Scioto River, in spite of the quarrying activities to the northeast.

Monitoring wells east and north of the landfill will be included in the long-term ground-water monitoring program for Bowers Landfill. Water level measurements from these and other wells in the monitoring network will detect any potential changes in ground-water flow direction caused by future quarrying activities.

7. One member of ACTION asked why ground-water samples were not collected from monitoring wells that exhibited elevated organic vapor readings in the well casings.

U.S. EPA Response: During the RI, a flame ionization detector (FID) was used to measure organic vapor concentrations at the top of each well casing, prior to purging or sampling the well. This procedure was used primarily to protect the health and safety of workers sampling the wells.

Only one well, P-6B, showed elevated organic vapor readings. This well was sampled in February 1987, April 1987, and March 1988. Only three organic compounds were found during these sampling rounds: benzene (2 sampling rounds, maximum concentration of 6 μg/L); acetone (2 sampling rounds, maximum concentration of 64 μg/L), and 2-methylnaphthalene (1 sampling round, maximum concentration of 2.8 μg/L).

8. One member of ACTION suggested that "background" samples for surface water and sediment were collected from locations that could have been affected by runoff from the landfill during heavy rains or flooding.

U.S. EPA Response: Background samples for surface water and sediment were collected from the east side of the Scioto River, upstream of Bowers Landfill. Sample results from these locations are not likely to have been influenced by the landfill. Surface water samples were not collected during flooding, but at a time when water was flowing from the background sampling location toward the landfill. Past floods could possibly have carried contaminated soil from the landfill, contaminating sediments away from the landfill. However, the background location would have been affected by this process only if substantial back-mixing of flood waters (flow in the upstream direction) occurred. U.S. EPA considers this unlikely.

9. During the remedial investigation, the Bowers Landfill Information Committee requested that additional deep monitoring wells be installed to clarify ground-water flow direction in the lower aquifer at the site.

U.S. EPA Response: U.S. EPA responded to the information committee's request and required the installation and sampling of two additional deep wells (P-12B and P-13B). These wells were installed in February 1988 and sampled in March 1988. Information from these two wells and other previously installed deep wells indicated that ground water in the lower aquifer flows southwest from the landfill.

4.7 Endangerment Assessment Issues

1. Two members of ACTION asked why the endangerment assessment (EA) did not consider previous sampling results from 1981. These comments focused on a 1981 study of Bowers Landfill conducted by Burgess and Niple. Ground-water samples collected during this study showed high levels of toluene, xylene, and ethylbenzene immediately downgradient of the landfill. Commenters were concerned that inclusion of these results would greatly affect the conclusions of the EA report.

U.S. EPA Response: As discussed on page 1-14 of the EA report, U.S. EPA did not evaluate the Burgess and Niple data for two reasons. First, the data were collected 6 years prior to the remedial investigation. While these data may represent past site conditions, the RI data more accurately assess current site conditions. Second, U.S. EPA could not assure the quality of the Burgess and Niple data.

Superfund endangerment assessments should be based only on validated sample results. The Burgess and Niple results were not validated and were, in some cases, contradictory. For example, samples collected from downgradient well MW-2 on July 17, 1981, showed high levels of ethylbenzene, toluene, and xylene when analyzed by gas chromatography (GC). Concentrations of these three chemicals were 66.8, 43.4, and 27 mg/L, respectively. However, when the same samples were analyzed by a different method, gas chromatography/mass spectroscopy (GC/MS), concentrations were much lower. Ethylbenzene and toluene concentrations measured by GC/MS were 2.48 and 2.53 mg/L, respectively, or 15 to 25 times lower than the GC results. (Xylene was either not measured, not detected by GC/MS, or not reported.

However, even if the EA had included the Burgess and Niple data, the conclusions of this report would not have been affected. The data would still show a potential risk from using ground water between the landfill and the Scioto River as a drinking water supply. If the highest of Burgess and Niple's results were considered, risk levels would be somewhat higher than those estimated in the EA. The hazard index, reflecting noncarcinogenic risks, would increase from 1.04 to approximately 29. Worst-case carcinogenic risks would increase from 9×10^{-6} to 3×10^{-5}.

An EA based on the Burgess and Niple results would still conclude that off-site residential wells were unaffected by the landfill. Burgess and Niple sampled six private wells south of Bowers Landfill shortly after high levels of ethylbenzene, toluene, and xylene were found in on-site wells. The private well results showed no evidence of contamination.

2. One member of ACTION wanted to know why U.S. EPA has compromised public safety by allowing a cancer risk of 1 in 10,000 for the site, a level "up to 100 times greater risk than that generally accepted."

U.S. EPA Response: This question appears to be based on a misunderstanding of information presented in the EA Report. U.S. EPA has not allowed a cancer risk of 1 in 10,000 for the site. The EA report stated that recent U.S. EPA guidance suggests that a target range for carcinogenic risks of 10^{-4} (1 cancer per 10,000 people exposed) to 10^{-7} (1 cancer per 10 million people exposed) should be considered at Superfund sites. Within this range, a risk of 10^{-6} (1 cancer per 1 million people exposed) is generally considered a benchmark for determining whether site conditions pose a significant risk. However, U.S. EPA policy is to evaluate risk levels at each Superfund site based on site-specific conditions.

In the case of Bowers Landfill, the EA report estimated that worst case risks (based on maximum contaminant concentrations and maximum exposure levels) were within the target range. Carcinogenic risks were estimated at 9×10^{-6} for ingestion of ground water adjacent to the site and 3×10^{-6} for ingestion of on-site soils. The remedial alternative proposed for Bowers Landfill should eliminate cancer risks from ground-water ingestion. By covering most contaminated soils, the alternative should reduce cancer risks from soil ingestion to 4×10^{-8}.

3. One resident was concerned that while the EA report evaluated health effects of individual chemicals, the report did not evaluate the effects of combinations of chemicals, particularly synergistic effects.

U.S. EPA Response: Approximately 60 chemicals have been identified in samples collected from various environmental media at Bowers Landfill. Because of this large number, it is not possible to identify and characterize all possible interactions of these chemicals, whether the interactions are synergistic, antagonistic, or otherwise. The EA was conducted according to established U.S. EPA guidance. This guidance requires that was conducted according to established U.S. EPA guidance. This guidance requires that when chemical interactions cannot be adequately characterized, additivity should be assumed. That is, the combined effects of two chemicals should be estimated as the sum of the individual effects of each chemical. The EA followed this procedure. For each exposure route, the effects of exposure to multiple contaminants were estimated by summing the risks for each individual contaminant.

4. One member of ACTION expressed concern that the endangerment assessment did not consider the possibility "that flooding might distribute contaminants and contaminated soil from the landfill."

U.S. EPA Response: Contaminants from Bowers Landfill, particularly those in site soils and sediments, could be distributed to off-site areas by flooding. However, transport and distribution of these contaminants by large volumes of floodwaters would greatly reduce concentrations compared to on-site levels. Risks to human health and the environment off-site would be correspondingly reduced compared to on-site risks.

The EA estimated on-site risks at relatively low levels, even under worst case exposure conditions. Off-site risks, due to possible contaminant distribution by floods, should be substantially less and well below levels of concern.

5. One member of ACTION stated that worst case exposure scenarios evaluated in the endangerment assessment weren't "really worst cases." Inhalation or ingestion of dusts while farming the field next to the landfill and ingestion of water from ditches next to the landfill were mentioned as specific concerns.

U.S. EPA Response: The EA evaluated human exposure to contaminants at or released from Bowers Landfill under probable case and worst case conditions. Exposure scenarios were developed to reflect exposure conditions that might reasonably be expected to occur at or near Bowers Landfill. This was done to identify a realistic range of risks to human health posed by the landfill. "Really worst cases" could be developed which would result in greater exposures and larger estimated risks to human health than for the realistic worst cases presented in the EA. However, such exposure scenarios are highly unlikely to occur.

For example, extensive swimming in or lifetime ingestion of surface water from on-site drainage ditches is theoretically possible. However, the ditches are shallow and filled with debris, conditions that make them unattractive as a swimming location or drinking water source. Furthermore, the general public near the landfill is well aware that the ditches are adjacent to a known hazardous waste site. Therefore, the theoretical "really worst case" exposure is extremely unlikely. The infrequent and incidental exposure to these waters, as presented in the EA, is a more realistic worst case exposure scenario.

As a second example, regular exposure to large volumes of contaminated dust (generated by agricultural activities in the field west of Bowers Landfill) is theoretically possible. Soils from this field contained lead concentrations above background levels. The National Ambient Air Quality Standard for lead of 0.0015 mg/m^3 represents a safe level for the general population. However, the EA estimated that even if all agricultural land was contaminated at the highest observed lead concentration, a total dust concentration of 15 mg of dust per cubic meter of air (mg/m^3) would be needed before lead concentrations exceeded safe levels. It is highly unlikely that such dust concentrations could be generated for any length of time, and agricultural workers would be exposed only intermittently. Exposure of off-site populations would be even less because dust concentrations would decrease during transport. Thus, as with surface water, theoretical "really worst case" exposure to contaminated dusts is highly unlikely.

6. One member of ACTION asked why the endangerment assessment ignored the possibility of southward migration of ground-water contamination.

U.S. EPA Response: The EA stated that off-site residential wells or the City of Circleville public water supply wells have probably not been affected by southward migration of ground-water contamination from Bowers Landfill. However, the EA did not ignore this possibility. Table 3-1 of the EA presents water quality sampling results for Circleville's water system. These results, collected between 1980 and 1987, show that water from Circleville's wells is of high quality and has not been affected by contamination from the landfill. More recent and extensive data from 1988, unavailable when the EA report was written, confirm this conclusion. Sampling results from residential wells south of the landfill were also presented in the EA report. Samples collected from these wells in February 1987 showed no evidence of contamination.

4.8 Other Issues

1. One member of ACTION wanted to know why the size of Bowers Landfill was listed as 80 acres in 1980, but only 12 acres in subsequent reports.

U.S. EPA Response: The 12-acre figure refers to the area where wastes were deposited. This L-shaped area, shown in various site drawings, is approximately 4,000 feet long and 125 feet wide. The 80-acre figure refers to the entire site area, including the landfill, drainage ditch to the east, and the agricultural field to the west. This area will be enclosed by a fence as part of the remedial action.

2. One member of the community expressed health concerns about "a higher than normal incidence of sickness" near the landfill. Another member of the community asked whether U.S. EPA "has done any studies to see if the incidence of cancer and leukemia in the youth of Circleville is greater than in similarly sized towns elsewhere."

U.S. EPA Response: U.S. EPA has not conducted any epidemiological studies of this type at Bowers Landfill. These studies are normally conducted by the Agency for Toxic Substances and Disease Registry (ATSDR). Based on Superfund Amendments and Reauthorization Act of 1986, ATSDR is required to perform a health assessment at each Superfund site. The health assessment is conducted independently of U.S. EPA's EA and is a preliminary evaluation of risks posed by the site. Depending on the results of this assessment, ATSDR can conduct pilot studies of health effects for selected groups of exposed individuals or a full-scale epidemiological study of exposed populations. ATSDR maintains an office at U.S. EPA Region 5 headquarters in Chicago. Questions on ATSDR's role and on epidemiological studies should be directed to Louise Fabinski at that office. She can be reached at (312) 353-8228.

5.0 REMAINING CONCERNS

U.S. EPA was unable to completely address several issues during remedial planning activities associated with the Record of Decision. These issues and concerns are summarized below.

Details of the ground-water monitoring program. U.S. EPA's Record of Decision provides details on several aspects of the ground-water monitoring program. These details include approximate locations of new wells, the list of chemicals to be sampled, and the sampling frequency. Additional details, including the exact number and locations of new wells and the wells to be included in the ground-water monitoring program, will be developed during remedial design.

Response plan for detection of contaminants in monitoring wells. Concerns were raised about the lack of a response plan if monitoring wells show increasing levels of contamination, once the clay cap has been installed on Bowers Landfill. Major issues included the contaminant levels that would trigger a response, the nature of the response, how quickly the response would occur, and who would be technically and financially responsible for the response. U.S. EPA has addressed these issues to the extent possible in the Record of Decision. Additional details will be resolved during the detailed design of the site remedy.

Operation and maintenance plan for landfill cap. Several residents expressed concern about procedures that will be used to ensure the integrity of the landfill cap. In the Record of Decision, U.S. EPA has provided a general description of operation and maintenance requirements for the cap. For example, the cap will be inspected quarterly, and repairs to all significant damage will begin within 30 days. Additional specific details must be determined after the cap is designed and constructed. Examples of such details include inspection methods and reporting procedures.

Construction of a fence around Bowers Landfill. Residents requested that a fence around the Bowers Landfill site, a component of the selected remedial alternative, be constructed as soon as possible. U.S. EPA will construct the fence on a priority basis during remedial action. However, the Agency cannot provide a specific schedule for fencing the site at this time.

Continuation of the Bowers Landfill Information Committee. Several residents requested continuation of the information committee to facilitate citizen involvement in the RD/RA process. U.S. EPA will continue the committee. However, the exact makeup of the committee will depend on negotiations with the PRPs. The results of these negotiations will determine who will be responsible for design and construction of the remedial alterative, and, thus, who will be on the committee.

APPENDIX A

WRITTEN COMMENTS ON THE PROPOSED PLAN FOR BOWERS LANDFILL

Comments Submitted at the
Public Meeting on
February 28, 1989

Name [illegible]
Address 11 [illegible] Road
Ashville Oh ZIP 43103
Affiliation ACTION
Phone 614-474-1240

Question:

Name AMY BROWN
Address 9230 MAPLE ST
STOUTSVILLE OH ZIP 43154
Affiliation CONCERNED MOTHER & CITIZEN
Phone 474-2507

COMMENT
~~Question:~~ WITHOUT YOUR HEALTH YOU HAVE NOTHING AND IF YOU PUT A PRICE ON THE PROTECTION OF IT YOUR ALTERNATIVES/IS LACKING. I BELIEVE THAT IF YOU GO WITH ANY OF YOUR ALTERNATIVES YOU CANNOT POSSIBLY MONITOR THE LEAKAGE WELL ENOUGH OR WILL NOT CHECK IT OFTEN ENOUGH TO BE ABLE TO AVOID FURTHER CONTAMINATION UNTIL IT HAS GONE TO WHAT WE ALL HOPE

34

Our Human Life. Lets Take Another Look At Some Alternatives That Are More Reasonable ~~[illegible]~~ For Preventative Reasons And Not Worry So Much About What The Ultimate Price Will Be First. If The Owners Are To Cover The $ Amount Why Not Do Things Right.

Name PAUL W TURNER
Address 13235 WINCHESTER RD.
ASHVILLE, OH. ZIP 43103
Affiliation ACTION
Phone 614-474-1240

Question: Why is the continuation of the Bowers Landfill Community Information Committee under consideration?

Address [illegible]

[illegible] **ZIP** [illegible]

Affiliation [illegible]

Phone [illegible]

Question:

Name PAUL W. TURNER

Address 13235 WINCHESTER RD.

ASHVILLE, OH **ZIP** 43103

Affiliation ACTION

Phone 614-983-2172

Question: My concern is with the synergism of the contaminants. We have been told that the levels of individual chemicals are within acceptable risk.

What is the affect of the combination of these contaminants?

Name George Hamrick

Address 420 Clairmont Ct

Circleville Oh **ZIP** 43113

Affiliation County Commissioner

Phone 614-474-2037

Comment. ~~**Question:**~~ I would hope that continued monitoring will take place.

Also if any increase in movement or degree of toxicity, action would be taken.

Finally - dollars are important, our county does not have the money that you are speaking of. We need your continued help.

Name John Stelorz

Address 437 North Court St.

Circleville OH **ZIP** 43113

Affiliation Citizen of Circleville

Phone

Question: What are the estimated costs of excavation of Bowers Landfill?

Name [illegible]

Address [illegible]

ZIP [illegible]

Affiliation A.C.T.I.O.N

Phone 983-3506

Question: Once contaminents from Bowers Landfill starts spreading who will be paying for the clean up?

Name GARY L. GILLEN M.D.

Address 6903 HAGERTY RD

ASHVILLE, OHIO **ZIP** 43103

Affiliation ACTION

Phone

Question:

Name A[illegible] H[illegible]

Address [illegible]09 Plaza Drive
Circleville, Ohio **ZIP** 43113

Affiliation ACTION

Phone 474-3544

~~**Question:**~~ Comment :

1. It is my opinion that problems are much more likely to occur as a result of leakage from the bottom of the site. This problem is completly ignored by all nine "preferred alternatives".

2. In reference to the question/comment made by Cindy Gillen: due to a technicality of the law (since the fill was not in use in 1980) we are not being given a remedy to our problem of toxic waste.

Name DUNKEL RALPH E.

Address 6141 ASH-FAIR-RD
ZIP 43103

Affiliation NUMEROUS

Phone 614-983-3239

Question: IT SEEMS TO ME, THAT IF SOMEWHERE DOWN THE LINE, SOME TOXIC FROM BOWERS LANDFILL GETS INTO PRIVATE OR PUBLIC WATER SUPPLIES RESULTING IN HEALTH PROBLEMS... SOMEONE SHOULD BE HELD LEGALLY AND FINANCIALLY RESPONSIBLE...

* INDIVIDUALS OF THE E.P.A. (WHO PARTICIPATED IN HEARINGS . THE ENGINEERING CO. THAT CONDUCTED TESTS ETC.

Name Stuart Edwards

Address 7011 Hiawatha Ave
Cincinnati OH ZIP 45227

Affiliation Dames & Moore

Phone 513 651 3440

Question:

Name John R Adkins

Address 16125 Winchester Rd
Ashville Oh ZIP 43103

Affiliation Attorney

Phone 614 474 3157

Question: The alternatives inaccurately assumes that the waste will be encapsulated with impermeable clay. A likelihood exists that leaching will occur therefore the most important aspect - future intervention and remediation of toxins to assure protection. Major plan components well testing, freq. of analysis, interdiction plan have not been addressed.

Worst case scenario.

Sufficient adjoined area perimeter
Liability not released
Some bureaucratic responsibility that cleanup of Fernald
Monitoring published
Surface & groundwater of chemicals not present

Additional Written Comments
Submitted by Citizens
During the Public Comment Period

Memo Regarding Bower's Landfill Cleanup
To: U.S. Environmental Protection Agency
From: John Payne, Area Resident
1665 Winding Road, Circleville, Ohio 43113

My name is John Payne, and I live in Circleville Township approximately 1/2 mile north of the City limits. The purpose of this letter is to state my feelings with respect to the options available to the USEPA and the USEPA's preferred option for cleaning up the Bower's Landfill Site.

The Circleville Herald recently reported the consideration by the U.S. EPA of nine cleanup options for the Bower's Site, and it also identified the option preferred by the U.S. EPA. The purpose of the reporting was to make public notice of the issue and of a public hearing to be held at 7 p.m. on February 28 in Circleville. I respectfully request that you accept my comments as part of the record of the February 28 meeting.

To respond to this issue and the cleanup options presented, I would like to begin by focusing on the issues that appear to be realistically open to discussion. To do that, I think it makes sense to eliminate options 2, 3, and 9 from consideration. These options reportedly do not comply with Ohio's landfill closure standards. I assume there was a logical explanation for including these options, but from a practical standpoint it does not make sense to discuss them. Option 1 is automatically eliminated as it is provided only as a basis of comparison.

The remaining options to be considered are numbers 4, 5, 6, 7, and 8. Within these options, the following matters appear to be the major differences which deserve further exploration:

- Cost
- Covering
- Drainage
- Flood Control.

I assume the issue of cost is very difficult to isolate. After all, I do not believe that we have had a great deal of experience in actually cleaning up hazardous waste sites as opposed to studying them. I am suggesting simply that cost should only be considered in a very general nature until evidence is presented which justifies more confidence in the numbers.

The choice of a covering mechanism essentially consists of two options: 1. A 24 inch clay cover under a 24 inch layer of top soil, or 2. The same as the first option except a synthetic membrane is installed over the clay and under the top soil. The U.S. EPA prefers the clay cover only option. I believe that the fact that the synthetic membrane option exists suggests that it is a safer, more effective method for covering the site. Therefore, without consideration of cost, the preferred option for area residents is simple - install the membrane cover.

Drainage options range from a simple drainage ditch with a new corrugated metal pipe to a leachate collection and gas venting system. The drainage pipe option should undoubtedly be much less expensive. This is the option preferred by the U.S. EPA. However, several questions are raised by the simple availability of the other options. First, where will the drainage ditch take the runoff? Does it matter? Next, what is the cost estimate for correcting a problem ten years or so from now if the gas collection problem becomes serious? What are the possible health consequences to the City? Finally, in what circumstances have gas venting and leachate collection systems been recommended and how do those circumstances differ from the Bower's Site? Again, the option most wanted by Circleville area residents is simple - construct the most sophisticated drainage system possible.

The flood control issue pertains mostly to the decision of whether or not to build a dike to protect the site from the Scioto River. The U.S. EPA does not prefer this. Building a dike would increase the cost of the cleanup considerably. Again, however, the fact that this option exists suggests that the construction of a dike improves the cleanup to some degree. Once again, without consideration of costs, the preferred option for area residents ought to be to build the dike.

It is apparent that the U.S. EPA has opted to recommend a cleanup procedure that meets the minimum standards allowed by the Superfund law and costs the least to implement. This indicates to me that their primary decision point is money, which is the least important consideration (I hope) for area residents. This difference probably encapsulates the conflict that I believe will exist at tonight's meeting.

Moving away from what appear to be the readily apparent discussion points, I would like to make some comments about my desires for the final option selected. First, with respect to the notice in the Herald, it is stated that, "Most contaminants were detected at levels considered safe...." This evokes the obvious questions concerning who did the testing and, more importantly, which chemicals were found to be unsafe. In addition to that rather frightening statement, the notice asserts that, "The endangerment assessment indicated that the overall risk posed by the site is low." It goes on to say, "The landfill does pose a threat of future contaminant release." These statements concern me.

I assume the more extensive the cleanup operation is, the lower the risk. If the EPA is asking what level of risk we are comfortable with, the answer is, of course, the least possible. I also assume that the threat of future contaminant release is lessened with each additional cleanup measure adopted. Again, we are naturally most comfortable with the cleanup option that leaves us with the least threat possible. This logic should prevail among Circleville area residents, and it sort of begs the question of why we are having a hearing process at all. Are we to believe this is a genuine opportunity to change the EPA's position?

Just in case the EPA is listening, I would like to put this situation in a more personal perspective. First, my wife and son drink Circleville water (at school, stores, etc.). The value of their health to me is higher than the value of all the other alternatives the U.S. government could spend our tax dollars on. When my son takes a drink at school, am I supposed to be comforted by knowing that the chances of the water being lethal are low? On a more selfish matter, the value of my house is very important to my family as well. When I try to sell my house, am I supposed to tell prospective buyers that our neighborhood Superfund site only poses a low threat of contaminant release?

Naturally Circleville area residents are far more concerned about their local environment than with the economies of cleaning up such an extensive site. This does not mean we do not understand the many other demands being made for federal money. It simply means that we expect the health and welfare of decent, taxpaying citizens to come first. I believe that the EPA's rightful job at this point is to cleanup the Bower's site to the best of its ability, notwithstanding cost. Then the EPA should pursue settlements from the potentially responsible parties involved in this matter with great tenacity. The threat created by the EPA's enforcement activity on the financial health of local companies and area employment is diminimous compared to the threat the site poses to our health and lifestyles.

To close this letter, I would like to state, in general terms, my position as just one citizen in the Circleville area. First, I believe that the technical discussions that will take place at the February 28th public meeting regarding types of chemicals, soil content, etc. are moot. We know the Bower's Landfill Site is horrible simply by its status as a Superfund Site. I do not see how the degree of horror is pertinent. Second, I would suggest to area residents and our elected officials that this is a time for activism, not conservatism. We have an opportunity to take care of this problem the correct way, to better ensure that our grandchildren and their grandchildren do not die horrible toxic related deaths, and to better ensure that our community continues to thrive.

It is time for all ordinary citizens to stand up and fight. It is not what we ought to do; it is what we have to do. We must push for the most comprehensive cleanup possible. As a person like many others in this area who loves Circleville, the truth behind this issue tears at my heart - allow the Bower's Landfill Site to show dangerous levels of leakage in the future, and Circleville will die completely, not partially.

Georgette Nelms
USEPA Region 5
230 South Dearborn
Chicago,Ill. 60604

Dear Ms Nelms,

Because I have lived in the area called Bowers Landfill before any dumping began, I am greatly concerned about clean up being done correctly for protection of the people in the Pickaway County area.

District Soil and Water representative Mark Scarpitti presented valid conflicting evidence about groundwater flow off-site. The EPA did not study groundwater flow outside the immediate area of the site and could be making a serious inaccurate assumption about potential risks to our water supply.

Montoring wells should be installed between the site and city wells. Previous testing at the site showed high levels of contaminats in leachate and groundwater in 1980 and 1981.

EPA has not drilled into this site to determine the location of wastes but is proposing a remedy to contain something. This site floods frequently which presents great potential for contaminant migration since its cleesure in 1968. EPA should require testing further out from the site until contaminats are located if not located at the initial test sites.

If no further testing is going to be conducted at least a flood protection dike should be installed.

Since EPA admits that if Bowers Landfill had operated after new laws had been put into effect it would be subject to stricter cleanup requirements why not use these new requirements on your own to protect the drinking water of the people in Circleville? If our local and state health departments had done their job starting in 1958 the recent testing and further testing would not be necessary now. Please do a complete job NOW!

Sincerely,

Ann Short
PO Box 307
Circleville, Ohio
43113

Ann Short
P.O. Box 307
Circleville, Ohio 43113

COLUMBUS, OH 430
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1985

Ms. Georgetta Nelms
USEPA Region 5
230 South Dearborn
Chicago, Ill. 60604

PA

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GFWC CIRCLEVILLE JUNIOR WOMEN'S CLUB
CONSERVATION COMMITTEE

March 12, 1989

Dear Ms. Neims,

Please take note that as a member of the Circleville Ohio community, I am very concerned about the proposal for the containment of the Bowers Landfill. I have worked with a number of the people who live close to the landfill and they all have nothing good to say about the area. They also seem to have a higher than normal incidence of sickness. If this is due directly to the landfill I cannot say for certain but from what I have read on the topic, you do not know that it is not making them more at risk.

I urge you to do everything in your power to make the clean-up of the sight, the toughest possible. In the long run, it will be cheaper to do it now than to have to pay to do it again later. It will also be cheaper do the best possible job now, then it will be to pay for the medical bills incurred down the road from the residents.

This is the only America we have and to destroy it by careless dumping and then to not take every measure to correct our mistake is really stupid. What are we leaving our children if they can't drink the water?

Sincerely,

H. Pat Whalen-Shaw

recycled paper

M. & P. WHALEN-SHAW
7041 ZANE TRAIL RD.
CIRCLEVILLE, OH 43113

U.S. POSTAL SERVICE CIR. O.
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Georgette Nelms

USEPA Region 5

230 South Dearborn

Chicago, IL 60604

50

March 12, 1989

To those it may concern,

The Action Committee of Circleville is certainly not kidding when they tell you about the land fills in Pike County. I have lived here for 70 years & every word they tell you is the truth. Please check out our water safety with your drilling that you know how to do

We want something done about this now.

Yours Truly -

Raymond Hott
Audrey Hott

Raymond Hott
[illegible] Park Dr
Cincinnati Ohio
73113

Georgette Nelms
USEPA Region 5
230 S. Dearborn
Chicago Ill. 60604

PA

Circleville, Ohio
March 13, 1989.

Dear George H. Nelms,

We live near the Bowers Landfill or hazardous waste site. We feel that a "flood protection" dike should be installed at the very least. Please use every precaution possible in closing this site. We need safe water and air.

Sincerely,
Mary Short.

712 North Court Street
Circleville, Ohio 43113
March 13, 1989

Georgette Nelms
USEPA Region 5
230 South Dearborn
Chicago, Illinois 60604

Dear Ms. Nelms:

In the interest of safety and good health for the citizens of Circleville, and also for property values, I feel some action should be taken to assure that the drums of chemicals that are buried in Bowers landfill should be removed. Or, possibly, some other method should be devised to make sure that the chemicals do not escape the landfill and get into our water supplies.

Has the EPA done any studies to see if the incidents of cancer and leukemia in the youth of Circleville is greater than in similarly sized towns elsewhere?

Another thought occurs to me. that the first report on contamination from Bauer's land fill stated that it was almost as bad as Love Canal in New York. The later report indicates it is not nearly that serious. Was the first report done? Was the second report wrong? Or did the chemicals somehow escape? Or. is the super-fund drying up for clean-up?

Thank You,
Heather D. Lynn
HEATHER D. LYNN
Don Lynn
DON LYNN
Dorothy Lynn
Dorothy LYNN
Lonnie Smith
Lonnie Smith

712 N. Court St.
Circleville Ohio 43113

COLUMBUS, OH 430
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1989

Georgette Nelms
USEPA Region 5
230 South Dearborn
Chicago, Illinois 60604

JOHN E. BOWERS
ATTORNEY AT LAW

233 NORTH COURT STREET
CIRCLEVILLE, OHIO 43113
(614) 477-1361

March 13, 1989

U.S. Environmental Protection Agency
ATTN: Mr. David Wilson (5HS-11)
Remedial and Enforcement Response Branch
230 South Dearborn
Chicago, Illinois 60604

Re: Bowers Landfill site, Pickaway County, Ohio

Dear Mr. Wilson:

The following comment is submitted regarding proposed plan and feasibility study for the above referenced site:

The proposed plan fails to address the fact that a large diameter natural gas transmission line crosses the northeast corner of the site. This line is owned by Columbia Gas Transmission Corp. and is designated as Line A-120. A map indicating the location of this line is attached hereto.

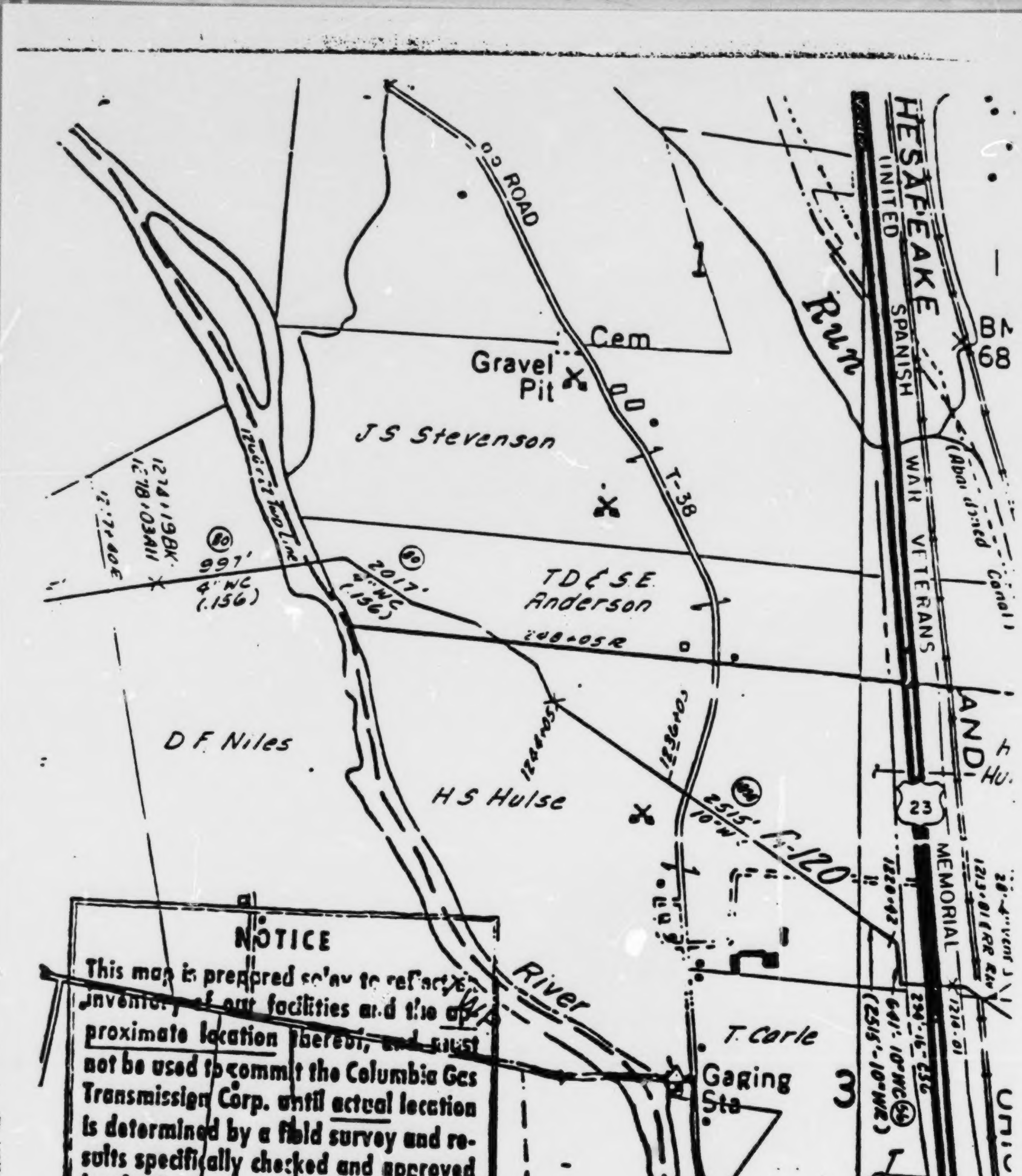
Please contact me if you wish to discuss this matter further.

Yours truly,

John E Bowers

John E. Bowers

JEB/cm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NOTICE

This map is prepared solely to reflect an inventory of our facilities and the approximate location thereof, and must not be used to commit the Columbia Gas Transmission Corp. until actual location is determined by a field survey and results specifically checked and approved by the Company. Therefore, Columbia Gas Transmission Corp. is in no way to be held responsible for the location of the facilities as shown hereon.

March 13, 1989
271 Clark Dr.
Circleville Ohio 4311

Georgette Nelms
USEPA Region 5
230 South Dearborn Chicago Ill. 60604

Dear Georgette Nelms

We in Circleville and Pickaway County feel we are in Catch 22 + with no return.

The Bowers landfill is worse than the Love Canal - toxic waste. We want from USEPA potential problems presented by our neighborhood Super-fund site corrected and controled by a fence around the site and monitoring the wells, between the site and the City's wells field should be immediately installed regardless of any cleaning decision - which should have been done 6 years prior to any Super-fund study.

We as people at least need this protection, if it isn't alread[illegible]

59

This matter lies on your shoulders to protect us from toxic water in the underground water of our wells.

We know you will help us now before its late - if it isn't already.

Thanks

Vera Saunders
211 Clark Dr
Circleville Ohio 43113

Georgette Nelms
USEPA Region 5
230 South Dearborn
Chicago Illinois 60604

Telefax

March 15, 1989

Georgetts Nelms
U.S. Environmental Protection Agency
Region 5
Office of Public Affairs (5PA-14)
230 South Dearborn Street
Chicago, IL 60604

Dear Georgette:

The EPA studies of the Bowers hazardous landfill site have dealt almost exclusively with the groundwater flow at the site and have failed to account for the likely event a good portion of the chemicals have moved offsite. Due to the frequent flooding of the area and due the porous nature of substratum below the dump, ie. gravel and sand, there is a high probability that large amounts of the toxics moved offsite years ago. Since the contaminants have a half life of hundreds of years and are not dilutable in water,they still exist. Additionally, these chemicals tend to bind to one another in a "plug of concentration". Where is the Bowers landfill plug of concentration?

The cleanup plan addresses the original dump site only and does not safeguard the city of Circleville's water supply from this plug of concentration. It is a mistake to consider a treatment of the original site as a solution. Circleville water wells must be safeguarded with a ring of monitoring wells around the city well fields and constant analysis of the pumped water. Without these safeguards, the physical and economic health of Circleville is in jeopardy.

Sincerely,

Timothy Krame

Timothy Kramer
405 Ridgedale Drive
Circleville, Ohio 43113
Phone (614) 474-3092

Kramer
405 Ridgedale Drive
Circleville, Ohio 43113

Georgette Nelms
U.S. Environmental Protection Agency
Region 5
Office of Public Affairs (5PA-14)
230 South Dearborn Street
Chicago, IL 60604

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3/15/89

Dear Mrs Helms,

Our family lives in Circleville, OH and are concerned by the EPA's plan for the clean up of Bowers Landfill.

The EPA's plan of containment is not in the interest of the people of Circleville. It is only a quick fix, the people here need a permanent remedy or Circleville will cease to exist.

The EPA has settled for a 1 in 10,000 cancer risk in Pickaway County while a 1 in 1 million cancer risk is commonly used in Superfund. Also Superfund site cleanups average $500,000 to $1 million per acre. While the proposal for Bowers Landfill is $350,000 per acre.

Bowers Landfill is near the city's water wells and the Scioto River. However, the EPA has no plans for monitoring wells or only limited monitoring that will be reduced in the future

The EPA's attitude seems to be hasty, just to be finished with this problem. We say do it right in the beginning. We are against the EPA's plan and hope our objections will be recorded.

Thank you
Ron Lieberman
Linda J. Lieberman

517 Elm Av
Circleville, OH
43113

PM 6
16 MAR

Georgette, Nelms
USEPA Region 5
230 South Dearborn
Chicago, Ill
60604

PA

Mr. & Mrs. William Bookout
575 Springhollow Road
Circleville, Ohio 43113
15 March 1989

Dear MS G. Helms:

We are writing in regards to the Bowers Landfill problem here in Circleville. Our aAction Committe, thinks the EPA plan is flawed. We are in complete agreement with them.

Please give us a break and MAKE a complete cleanup of this mess. Before someone dies for our governments mistake.

Sincerely
William J. Bookout
WILLIAM J. BOOKOUT

ANNA M. BOOKOUT
Anna M Bookout

- 67 -

MR WILLIAM BOOKOUT
576 SPRINGHOLLOW RD
CIRCLEVILLE OH 43113

COLUMBUS, OH 430
PM
15 MAR
1989

SAVE
YOUR VISION
WEEK

GEORGETTE ELLIS
USEPA Region 5
230 South Dearborn
CHICAGO, ILLINOIS 60604

March 16 1989

To Whom It May Concern,

We, the undersigned, must strongly protest the methods by which the USEPA is deciding to "fix" the Bowers Landfill. It will not solve the problem of protecting our water supply in Circleville, Ohio. Our water must be protected at *any* costs! We *must* have monitoring wells between the site and the City well field. We *must* also have *more* monitoring at the site itself. After all, we live here, the ones involved in the USEPA don't! They don't have to worry about their children's 1 in 10,000 risk of *Cancer* that they're allowing for Pickaway County!

Mr. & Mrs. Danny L. Rose
Mr. & Mrs. Elmer Lowery
Mrs. Virginia Christman

PO Box 255
Circleville, Ohio
43113

Georgette Nelms
USEPA Region 5,
230 South Dearborn,
Chicago, Illinois
60604

FA

J. L. Parish
District Agent & Registered Representative

Mr. Pitme.

I respectfully request that every measure possible be used to "clean-up" the Bowers Landfill Superfund site in Pickaway Co. Ohio. As a life-long (48 yrs) resident of this community I'm greatly disturbed by the rising incidence of cancer. I received correspondence approx 5 yrs ago from the American Cancer Society (of which I am a member) stating that only the city of Cincinnati has a higher incidence of cancer than Pickaway County. Please help us!

- Sincerely

Jerry & Barbara Parish

Comments from ACTION
(a Local Environmental Group)

ACTIVISTS CONCERNED WITH TOXICS IN OUR NEIGHBORHOODS
111 Island Road, Circleville, Ohio 43113

Office Hours: Wednesday 9 a.m. - 2 p.m.
Office Phone: 1-614-474-1340
Recordaphone will answer at other times.

TO: Erin Moran, Project Director, USEPA Region 5

FROM: Gary L. Gillen, M.D.
ACTION Representative on the Bowers Landfill Community Information Committee

INRE: Bowers Landfill Superfund Site
Comments on the Remedial Investigation Report Dated 11-18-87 and Endangerment Assessment Draft Final Report

DATE: January 6, 1988

The tone of the discussion of the 1981 Burgess and Niple report strikes me as unusual. The discussion questions the validity of the findings in the Burgess and Niple report and discussed the deteriorated condition of the wells that were drilled in 1981. I have several reactions to that discussion. Burgess and Niple is known to me as a generally well respected engineering firm which Circleville City has used for their water testing. If it's that easy to question the results of a well respected firm in a study, how easy will it be to bring in question the results of the Dames and Moore report in 5 or 6 years? If all that is required is spending 3 or 4 times the money to do that, then we are looking at going through all this again in the 1990's at a cost of 1 or 2 million dollars to throw out much of what is found today. Being a generally respected firm, I also assume that Burgess and Niple took some kind of precautions that the wells they drilled were well constructed and secure to protect their reputation and our groundwater. The condition of those wells as described in the Dames and Moore report is appalling. Either their precautions were inadequate, or they were constructed in an irresponsible fashion. How do Dames and Moore's precautions compare in the construction of the new wells? How quickly will history repeat itself? Why should we not believe that elevated readings of organic vapors found in those wells represent a serious contamination problem? The water from those wells with the elevated readings was not tested.

?

Our other major observation about the Remedial Investigation is that well placement and groundwater flow have combined to perhaps miss major areas of contamination of the groundwater. Flow in the deeper aquifer was found to be close to straight south, but there are no sampling wells in the deeper aquifer south of the north-south leg of the landfill. This observation also has impact on the endangerment assessment in that the one route which will expose large numbers of people to a contaminant release is to the south where the city of Circleville has its well field 1½ miles from the landfill. This potential exposure is minimized in the endangerment assessment in spite of the fact that no sampling was done in that direction and flow rates are given that would place any contaminants as far as ½ to 2/3 of a mile south of the landfill.

We believe that background contamination of the Scioto River sediment probably is very bad as found in the Remedial Investigation report because of many years of pollution of the river by waste disposal practices within the city of Columbus. However, the samples done for background are close enough to the landfill that they could have been affected by run-off from the landfill during very heavy rains or flooding.

We offer the following criticisms of the Endangerment Assessment having already noted that we believe that insufficient weight is given to possible southward migration of contaminants in the groundwater to the Circleville well field in the deeper aquifer. Some of the "worst case scenarios" cited aren't really worst cases. For example, the report cites some studies of pica in children as the heaviest possible exposure by ingestion of soils, but having done some field cultivating myself, I would be reasonably sure that farming the land at the landfill could easily result in greater than 0.6 gm ingestion depending on wind speed and direction. The scenarios given also don't review the possibility of a concentrated exposure over time that might occur if a seepage would occur into the drainage ditch and a child spent some time wading, swimming in, and drinking from it. Given a sudden release of material during the frequent flooding cited, what would be the resulting exposure to areas also flooded downstream such as Circleville's well field?

The Endangerment Assessment does not address what changes might occur at the site due to graveling operations. These are occuring adjacent to the site and could cause changes in the groundwater movement if large quantities of gravel are removed.

1/6/88

The section of the report on cancer risks gives a "target range" of 10^{-4} to 10^{-7} as figures for risk of additional cancers. They try to hedge by saying that these are not intended to be "acceptable levels", but if clean-up is to these levels they will have to be accepted as the result of clean-up. As I understand these discussions, the "target range" of 10^{-4} is up to 100 times greater than that "generally accepted".

In summary, we find the following:

1. We find some difficulties with the Remedial Investigation if additional testing is not done to the south of the landfill in the deep aquifer.
2. We find that inadequate explanations are offered for discrepancies between present test results and earlier testing done at the site.
3. Background levels of sediment contamination may have been affected by contaminants from the landfill.
4. We find the "target range" for risk of cancer to be higher than we would consider acceptable.

We would respectfully request that consideration be given to additional deep wells near to the site and at a distance to confirm the hypothesis that contamination has not migrated in a southern direction toward the area of potentially greatest exposure to the nearby population.

We would also request that sampling continue before and during the Feasibility Study and any proposed clean-up to protect the surrounding area from any migrating contaminants not identified in the initial examination since it differs dramatically from earlier studies at the site.

Lastly, we request that in addition to the public question/answer meeting that there be a public written formal comment period of 90 days. We are aware that public written formal comments have been allowed at other sites. At Stringfellow in California the Feasibility Study began during the written comment period for the Remedial Investigation. The residents of Pickaway County will be most affected by and have to live with what results from the Remedial Investigation and should have the opportunity to submit their comments to be part of the formal record. It is too late to expect citizens to comment on the Remedial Investigation after the Feasibility Study. If citizens' comments are given serious consideration, then they should be welcomed when they are the most relevant at each phase of the Superfund process.

1/6/88

ACTIVISTS CONCERNED WITH TOXICS IN OUR NEIGHBORHOODS
111 Island Road, Circleville, Oh 43113 474-1240

TO: Erin Moran, Project Director, USEPA Region 5

FROM: Gary L. Gillen, M.D.
ACTION Representative on the Bowers Landfill Community Information Committee
William A. Myers, M.D., ACTION Alternate Representative

IN RE: Bowers Landfill Superfund Site
Comments on the Remedial Investigation Report Dated 4-28-88 and Endangerment Assessment Final Report

DATE: June 2, 1988

We continue to be overwhelmed by the process of evaluating and reviewing a Superfund site. Our present system relies on "adversaries" who argue opposing points of view. Each has the objective of "winning" their argument or obtaining a compromise that will come close to what they want to accomplish. Sometimes the objective is simply to prevent the "other side" from winning. An ideal system would find industry interested in identifying problems before they cause trouble and taking care of them before anyone gets hurt. A good system would have an impartial government agency that would identify a problem and see to it that those responsible for the problem did their best to take care of it. Instead, we have had a system in which industry has to avoid taking any responsibility for a problem so they are not put at an economic disadvantage or risk getting sued for admitting responsibility. The regulators have so far felt a responsibility in protecting the identified industries (potentially responsible parties) from unnecessary financial harm because of the unjustified fears of an "hysterical" public. So we have the ludicrous situation of citizens being forced to become experts in their local areas in order to adequately oversee the regulators overseeing the responsible parties. We ought to all be most interested in seeing that our various community problems are solved quickly and completely. We have many more interesting ways that we could spend this time than reviewing the 15 inches of documents so far generated or spending over 2 hours on the phone with various experts who donate their time for our benefit. There is no better way we could spend that time for the benefit of our community though.

We were gratified that additional wells were placed in the deep aquifer as we had suggested. We remain skeptical about the location and extent of sampling because of the apparent disparity in findings between the present study and earlier ones which had indicated heavier contamination than has been found in the present study. We remain unimpressed with the argument that previous studies' results should somehow be ignored because of possible inadequate quality control. The compounds (mixed xylenes, toluene, ethylbenzene) that were found in those studies in significant amounts are not ones that would likely be due to lab error or external contamination. The previous results would seriously change the results of the Endangerment Assessment. Our consultants also reviewed the data used to determine the direction of groundwater flow. The data are not totally convincing that the flow is definitely to the west. The water levels and wells are close enough to each other to make it difficult to say. The additional work plan stated there would be three additional wells drilled into the deep aquifer. Only two were done with no explanation. As we have previously suggested, wells further from the site could be helpful in that regard.

Chapter 5 of the Remedial Investigation (RI) notes that tetrachloroethene might be related to activities at the sand and gravel quarrying operation adjacent to the landfill. Since it is a solvent generally used in dry cleaning clothing and industrial applications, we doubt that it would likely occur about sand and gravel quarrying unless they were experimenting with dry cleaning the gravel. Such comments and logic cause one to pause and ponder the real motive of those doing the evaluating.

We note that this draft of the report states that extensive sand and gravel quarrying does occur about the site. The report also speculates that those exposed areas of high water permeability may aid in creating part of the hydraulic pressure moving the groundwater to the west. The report does not speculate what will happen to groundwater flow and the contaminants the water contains should those quarrying operations reach below the water table as they have at locations south of the site.

The RI states in Chapter 2 that the threat to the Circleville well fields is probably very slight because the sand and gravel at the site is very permeable and relatively unconfined, yet we are told that the Scioto River acts as a barrier to westward migration of contaminants because the groundwater discharges uphill into the river from the groundwater 20-60 feet down. That sounds far-fetched.

The report continues to document very well that the landfill is flooded frequently and further that the "clay layer" under the landfill might slow movement into the groundwater, but we still have very little comment about how that flooding might distribute contaminants and contaminated soil from the landfill. The Endangerment Assessment also gives little space to that question - even though, whatever is done to the site, it is safe to say that it will continue to be flooded very frequently after some remedy is performed on the site.

We found it very interesting that the Endangerment Assessment made a table of proposed scenarios of impact of our site of present and future dangers. Of the 10 scenarios sited, 7 were cited as possible dangers to "recreational users" of the site. The RI documented use of the site by fishermen and users of all-terrain vehicles. We have stated on numerous occasions since 1984 that the landfill should have a fence around it. A simple fence around 12 acres in 1984 would have reduced all of those exposures and future exposures to only those who were intent on being exposed at far less cost than a small fraction of what this study has cost so far. Now we have a study that we still have trouble with, and all those exposures are still continuing. We propose that the single most cost-effective procedure that could have been done to reduce past and future exposures to contaminants in the landfill would be to limit recreational use of the area by means of a fence.

We will continue to request that provisions be made to test nearby water wells, including those for the city of Circleville, on a regular basis for appropriate contaminants and that said testing should occur quarterly. We also understand that at other Superfund sites requirements of safe "clean-up" have been defined at the point of exposure. We will have great difficulty with any plan which proposes to achieve "relevant and appropriate requirements" by a mathematical formula at the Circleville well fields or nearby wells.

In summary, we find the RI and Endangerment Assessment flawed, inadequate and unacceptable by the continued attempts to make the results fit what the regulators and responsible parties want to do or not do to the site, by an attempt to minimize major problems thwarting clean-up at the site because they don't know what to do about it, by an attempt to minimize hazard to avoid frightening local residents, and by an attempt to minimize

6/2/88

problems to avoid putting too much economic stress on the responsible parties. We have many of these same concerns, but attempting to tiptoe around these areas will only reduce our ability to solve the problems at the site to the best of our abilities. That could hurt our community, our industries, and our legacy to future generations.

These written remarks are to be published with the Final Remedial Investigation report as agreed upon by Ms. Jennifer Hall, USEPA Region 5.

cc: Valdus Adamkus, USEPA Region 5
Richard Shank, OEPA Director
Governor Richard Celeste
Senator Frank R. Lautenberg
Attorney General Anthony Celebrezze, Jr.
Pickaway County Commissioners
Stephen Lester, CCHW

Rep. Mike Dewine
Senator Jan Long
Rep. Mike Shoemaker
Mayor Mike Logan
Senator John Glenn
Senator Howard Metzenbaum

6/2/88

ACTIVISTS CONCERNED WITH TOXICS IN OUR NEIGHBORHOODS
111 Island Road. Circleville. Oh 43113   474-1240

PRESS RELEASE - Bowers Landfill Superfund Site Public Meeting
Wednesday, Sept. 14, 1988, 7 p.m., Circleville High School Cafeteria
Contact: ACTION, 474-1240; Spokespersons: Paul Turner, 983-2172 and
Gary L. Gillen, M.D., 474-2126 or 474-8818 or 474-5303

We find the Remedial Investigation (RI) and Endangerment Assessment flawed, inadequate, and unacceptable by the continued attempts to make the results fit what the regulators and responsible parties want to do or not do to the site, by an attempt to minimize major problems thwarting clean-up at the site because they don't know what to do about it, by an attempt to minimize hazards to avoid frightening local residents, and by an attempt to minimize problems to avoid putting too much economic stress on the responsible parties. The following are examples of the flawed logic contained in the two reports:

1. We remain unimpressed with the argument that previous studies' results (OEPA in 1980 and Burgess & Niple in 1981) should somehow be ignored because of possible inadequate quality control. The compounds (mixed xylenes, toluene, ethylbenzene) that were found in those studies in significant amounts are not ones that would likely be due to lab error or external contamination.
2. Since tetrachloroethene is a solvent used in dry cleaning clothing and industrial applications, we doubt that it would occur in the adjacent sand and gravel quarrying as Chapter 5 of the RI states unless they were experimenting with dry cleaning the gravel.
3. The reports do not speculate what will happen to groundwater flow and the contaminants the water contains should adjacent quarrying operations reach below the water table as they have south of the site.
4. The data are not totally convincing that the groundwater flow is definitely to the west since water levels and wells are close enough to each other to make it difficult to say. As we have previously suggested, wells further from the site could be helpful in that regard.
5. In Chapter 2 of the RI we are told that the Scioto River acts as a barrier to westward migration of contaminants because the groundwater discharges uphill into the river from the groundwater 20-60 feet down. That sounds far-fetched.
6. Both reports document very well that the landfill floods frequently but neither addresses how that flooding might distribute contaminants and contaminated soil from the landfill.
7. Of the 10 present and future dangers sitrd, 7 were sited as possible dangers to "recreational users" of the site (fishermen and all-terrain vehicles). We have stated on numerous occasions since 1984 that the landfill should have a fence around it for this reason. The single most cost-effective procedure that could have been done to reduce past and future exposures to contaminants in the landfill would be to limit recreational use of the area by means of a fence. A costly inadequate study was certainly not necessary to determine this.

In conclusion, such comments and "logic" cause us to pause and ponder the real motives of those doing the evaluating. It appears we have a system in which the regulators feel a responsibility to protect the responsible parties from the unjustified fears of an "hysterical" public. So we have the ludicrous situation of citizens being forced to become experts in their local areas in order to adequately oversee the regulators overseeing the responsible parties. To tiptoe around obvious areas of concern will only reduce our ability to solve the problems at the site to the best of our abilities. That could hurt our community, our industries, and our legacy to future generations.

ACTIVISTS CONCERNED WITH TOXICS IN OUR NEIGHBORHOODS
111 Island Road, Circleville, Ohio 43113 474-1240

TO: Erin Moran, Project Director, USEPA Region 5

FROM: Gary L. Gillen, M.D.
ACTION Representative on the Bowers Landfill
Community Information Committee

IN RE: Bowers Landfill Superfund Site
Comments on the Feasibility Study, Second Draft Report
Dated August 19, 1988

DATE: November 2, 1988

Our comments on the second draft of the Feasibility Study should not be taken to imply that we have accepted the findings of the Remedial Investigation and Endangerment Assessment. We continue to find those reports seriously flawed in two main areas. First, the findings are significantly different from work done earlier at the site by Burgess & Niple and by Ohio EPA without any adequate explanation. I can suggest two possibilities that are at least as good as those given. There may have been significant leaching of contaminants into the groundwater at the time of the earlier studies which was quiet at the time of the present study due to local hydrogeologic factors related to the recent two year drought conditions, or the earlier findings might have been related to a migrating plume of contaminants that has now moved off-site. Secondly, one cannot determine that groundwater flow from the site is only to the west without additional studies off-site to determine whether groundwater flow on the west bank of the Scioto River might be coming east to combine with material from the site and then follow the river flow to the south toward the city well fields. Attached to my statement is a letter from Mark Scarpitti of our District Soil and Water Conservation Office confirming that others with training in soil and water agree that these are valid concerns not addressed in the Remedial Investigation. Specifically, Stanley Norris' report on the groundwater situation in the Circleville area (6) verifies that a southerly flow could occur in this area.

In regard to the Feasibility Study, Second Draft, presented to us, it appears that once again, as has happened frequently across the country, the contractor and the EPA are choosing a "containment" method for our site even though the law as revised in 1984 now requires the EPA to prefer permanent remedies for sites. A recent report by traditional environmental groups and the Hazardous Waste Treatment Council (1) examined 75 records of decision (ROD's) produced by EPA in 1987 and found that full waste treatment was recommended in only 6 cases, partial treatment was recommended in 18, and no treatment at all was recommended in 51 cases or 68% of the sites. They recommended a clay or asphalt cap for some, a slurry wall to contain some, or excavating the wastes and reburying them in another landfill creating a toxic merry-go-round for others. We find that the present document defines containment with even less structure (i.e., to "maintain the cover" and use rocks to "stabilize" the landfill from washing away from frequent flooding). The traditional clay cap or plastic cover are dispensed with as not "cost effective". This is interesting, because under SARA, cost effective received a new definition. Cost effective is defined now as that "in determining the appropriate level of cleanup, the President (through his agency, the EPA) first determines the appropriate level of environmental protection to be achieved and then selects a cost effective means of achieving that good". If containment is the appropriate level of protection determined for our site, and flooding is the major external source of water washing out the landfill, then the minimum containment method would have to protect the site from flooding. Only the proposed flood dike would do that of the methods examined which was eliminated because it was not cost effective for our site.

In their review of 100 Superfund sites, the Office of Technology Assessment published a summary report in June, 1988, (5) which was critical of EPA's frequent use of unproven technologies. The proposal to maintain the present cover on the landfill as a containment method is one such unproven technology. I must admit some discomfort in bringing up the point because the only other proposals for cover involve a clay cap or a plastic cap. Both of those have been proven to fail to permanently contain at sites where they have been used. I described this Feasibility Study proposal to Dr. Peter Montague, an expert in hazardous waste sites all over the country. He believes this sounds like a variation of several proposals happening at some sites which has been described as "natural flushing". He thought this proposal is the equivalent of doing nothing while waiting for rainfall and floods to flush the contaminants into the surface and groundwater. So, the proposal is not even a containment method, but a treatment method apparently designed to reduce some contaminants at the site by washing them away to parts unknown. In a 1981 study (7), the U.S. Public Health Service is critical of the concept that diluting groundwater will reduce concentrations. They note that often chemicals will migrate in groundwater without changing concentration as can happen in surface water. Some can even concentrate under certain circumstances. The cost estimates also do not take into account the potential for astronomical increases when these impermanent remedies eventually fail (5).

The proposal for monitoring wells is inadequate with no provision for wells further off-site and with no provision for determining when, where, and how any action might occur as a result of the monitoring or who might be responsible for the costs of further action at the site when a failure is documented. Further, there is no definition of what levels of which chemicals might be identified as a reason for further action. Will we go through more studies to determine a next step? The EPA has previously accepted such proposals for monitoring a site to detect a "failure" without defining what a failure is (5). We should not repeat that mistake.

We are pleased to see a proposal for site restriction which includes a fence as we have recommended since 1984. I suspect it will be at least 1990 before that fence exists at the site. That is unfortunate, especially for those who unknowingly wander on-site.

In the past, EPA has pushed most records of decision to meet their annual report deadlines which has led to poor cleanup decisions (5). We do not want to be another poor decision statistic. If this Feasibility Study is approved without changes, we request that the 30 day public review and comment period occur after the busy holiday season (after the first of the year). We expect our written comments to be published with the final Feasibility Study as they were with the Remedial Invnstigation.

11/2/88

ACTIVISTS CONCERNED WITH TOXICS IN OUR NEIGHBORHOODS
111 Island Road, Circleville, Ohio 43113 474-1240

cc: Valdus Adamkus, USEPA Region 5
Richard Shank, OEPA Director
Governor Richard Celeste
Senator Frank Lautenberg
Attorney General Anthony Celebrezze, Jr.
Pickaway County Commissioners
Stephen Lester, CCHW
Lee Thomas, USEPA
Senator Howard Metzenbaum
Rep. Mike Dewine
Senator Jan Long
Rep. Mike Shoemaker
Mayor Mike Logan
Senator John Glenn
Peter Montague
Joel Hirschorn, OTA
John Adkins
Mark Scarpitti

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(11) Personal Communication, Mark A. Scarpitti, District Conservationist, United States Department of Agriculture, Soil Conservation Service, Circleville, Ohio, October, 1988.

11/2/88

United States
Department of
Agriculture

Soil
Conservation
Service

Dr. Gary Gillen
Action Rep. Bowers Landfill
111 Island Road
Circleville, Ohio, 43113

October 25, 1988

Dear Dr. Gillen,

I attended the Ohio EPA Remedial Investigation public information meeting of the Bowers landfill on Sept. 14, 1988.

At that meeting the engineer representing EPA stated that according to their study, the ground water in the vicinity of the landfill on the east side of the Scioto River flowed from east to west or toward the river. It was emphasized that groundwater generally flows downhill. The conclusion was drawn that any possible seepage from the Bowers landfill would also flow toward the river and would therefore pose no threat of contamination to municipal water supplies. The municipal wells are located approximately 1.5 miles south (downstream) of the landfill adjacent to the Scioto River.

When I ask him if it was logical to assume that groundwater west of the Scioto River flowed east toward the river, he stated it was possible but that no study of groundwater movement had been conducted west of the river.

I asked him further if groundwater on each side of the river were in fact moving from the uplands to the river (downhill) wouldn't it be likely that the water would meet at the river and turn south or downstream. He stated that it was possible but the groundwater movement was not studied to that degree.

Since that meeting I have tried to research the assertion that the groundwater in the Circleville area does move from the uplands to the floodplain toward the Scioto River. And that as it approaches the river it turns in a southerly direction with the flow of the river.

I have been in contact with the Ohio Department of Natural Resources, Division of Water, Section of Ground Water. They indicated that it is common for the ground water to generally follow surface water unless restricted by some impervious layer. And that it is likely that the ground water does move toward the river. They indicated it is also likely that some of the ground water surfaces at the river while the other portion remains in the gravel aquifer under the riverbed and moves parallel with the river.

They referred me to several publications concerning the ground water flow in the Scioto River basin. One such study from the Ohio Department of Natural Resources, Division of Geological Survey is Report of Investigations No. 96. "The Ground-Water Situation in the Circleville Area, Pickaway County, South-Central Ohio". This report was written in 1975 by Stanley E. Norris, Hydrologist as a result of a study conducted of the ground water supply in the Circleville area. In this report Mr. Norris speaks of the principal source of recharge into the aquifer in the area of Circleville;

> "The principal source of recharge to the aquifer supplying the industrial wells is precipitation. Some precipitation enters the aquifer within the area underlain by the cone of depression, but most enters upgradient from the cone and flows into it in response to the regional gradient. Generally the potentiometric surface in the Circleville area is higher in upland areas. Consequently, ground water moves from the uplands toward the Scioto River valley. This component of recharge, moving in response to the regional gradient, is referred to here as underflow.
>
> Where the sand and gravel deposits are separated by a semiconfining bed, water from precipitation reaches the wells after moving downward through the semiconfining bed. Or, water may enter the lower aquifer directly in areas where the semiconfining bed is absent and move laterally beneath the semiconfining bed. Water also enters the aquifer from the Scioto River by influent seepage where the water table is below the stream..."

After talking with the Division of Water and studying the reports available, I believe the safe assumption is that hazardous chemical waste from the Bowers landfill does have the potential of contaminating downstream water supplies and any landfill clean-up efforts should consider this potential.

I am a little surprised and disappointed that the investigations conducted by EPA did not study ground water flow surrounding the landfill as well as in the immediate area of the landfill.

If you have any questions please let me know.

Sincerely,

Mark

Mark A. Scarpitti
District Conservationist

10/25/88

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ACTIVISTS CONCERNED WITH TOXICS IN OUR NEIGHBORHOODS
111 Island Road, Circleville, Ohio 43113 474-1240

TO: Erin Moran, Project Director, USEPA Region 5

FROM: Gary L. Gillen, M.D.
ACTION Representative on the Bowers Landfill
Community Information Committee

IN RE: Bowers Landfill Superfund Site
Comments on the Feasibility Study, Third Draft Report
Dated February 3, 1989

DATE: February 28, 1989

Most of the comments of our letter of November 2, 1988, (attached) still apply to this third draft of the Feasibility Study. I was pleased to see much better discussion of treatment options. I remain disappointed that some alternative to containment has not been identified for our site. There is better discussion of how groundwater monitoring might be done. There is still not sufficient clarification as to what will happen and who will be responsible when various contaminants are identified. I will expect these details in the Record of Decision but I would have appreciated the opportunity to comment on them in the Feasibility Study. We still believe that some monitoring wells need to be installed off-site in the direction of Circleville City's water wells. According to our local Soil and Water Conservation representative (statement attached), one cannot determine that groundwater flow from the site is only to the west without additional studies off-site to determine whether groundwater flow on the west bank of the Scioto River is coming east to combine with material from the site and then follow the river flow to the south toward the city well fields. A fence remains a protection factor which has yet to be constructed.

The discussion of the alternatives which mention a clay cap correctly observes that the cap would provide some protection from flooding by covering the landfill to prevent flood waters from eroding away the surface and that flood waters will infiltrate less if a cap is in place. There is no discussion, however, regarding maintenance of the clay cap through repeated flood events which occur at our site. I believe that the costs of maintaining a cap and ground cover through repeated flooding could make a flood control dike look much more cost effective. A flood control dike will also require maintenance but not the kinds of extensive repairs that the clay cap will require when it is overrun completely every 5 years (as reported in this study) and at least partially overrun every year. It should be kept in mind that all of the testing data and observations in this report were made early and in the middle of the worst drought to affect this area in the past 60 years.

The study continues to speculate about the possibility of "maintaining the present cover" as a containment strategy. I agree that it is an idea worthy of speculation given the known problems of clay caps and synthetic membrane caps, but our site is not a proper one for such speculation with contaminants poorly identified as to location and concentration. We agree that there is no reason to choose between a clay cap and a synthetic membrane cap. They are both prone to deterioration and entirely dependent upon expert installation and maintenance. Both can leak without obvious appearance, and both will leak eventually.

A cap alone will not adequately protect our site from erosion and infiltration of water during frequent floods. A flood control dike would be an important safeguard to the integrity of the remedial action.

We conclude that the Remedial Investigation, Endangerment Assessment, and Feasibility Study are flawed, inadequate, and unacceptable. They make repeated attempts to make the results fit what the regulators and responsible parties (PPG & Dupont) want to do or not do to the site. They attempt to minimize major problems thwarting clean-up at the site because the contractors and the agencies don't know what to do about it. They attempt to minimize hazards to avoid frightening local residents and to minimize problems to avoid putting too much economic stress on the responsible parties. We believe that any containment plan is doomed to fail and that such plans must be reinforced to the maximum and monitored carefully to discover the failure when it occurs and should specify who will be financially responsible when the failure occurs. We believe the responsible parties should bear the costs of containment failure and maintenance and in correcting any contamination problems.

cc: William Reilly, USEPA
Valdus Adamkus, USEPA Region 5
Governor Richard Celeste
Senator Frank Lautenberg
Attorney General Anthony Celebrezze, Jr.
Pickaway County Commissioners
Stephen Lester, CCHW
Senator Howard Metzenbaum
Rep. Mike Dewine
Senator Jan Long
Rep. Mike Shoemaker
Mayor Mike Logan
Senator John Glenn
Peter Montague
Joel Hirschhorn, OTA
John Adkins
Mark Scarpitti

2/28/39

ACTIVISTS CONCERNED WITH TOXICS IN OUR NEIGHBORHOODS
[illegible]11 Island Road, Circleville, Ohio 43113   1-614-474-[illegible]

MEMO TO: USEPA Region 5

FROM: Cynthia Gillen, ACTION

IN RE: Bowers Landfill Remedial Investigation & Feasibility Study

DATE: February 28, 1989

I have several concerns about what is being proposed for Bowers Landfill and the Superfund process that has transpired.

The Bowers Landfill was included as one of 19 Ohio sites on the National Priority List for Superfund cleanup in 1982. Among those sites, it had a Hazard Ranking Score or potential to cause harm of 3rd within the state. The highest hazard score was for potential groundwater contamination. In 1980, OEPA identified toluene, benzene, and ethylbenzene in leachate from Bowers Landfill. In 1981, Burgess & Niple found high concentrations of ethylbenzene, toluene, and mixed xylenes in downgradient wells.

The present study has significantly different findings from previous testing and attempts to ignore previous findings or speculate about problems with laboratory quality control and possible lab contamination of samples. This logic is flawed for several reasons. The labs doing the previous testing were both OEPA approved chemical laboratories. Burgess & Niple's work was also coordinated and approved by USEPA Region V. The kinds and amounts of contaminants found in the samples are not likely to have occurred from laboratory processing and handling. There are at least two more logical reasons which are given no consideration. There may have been significant leaching of contaminants into the groundwater at the time of the earlier studies which was quiet at the time of the present study due to local hydrogeologic factors related to the recent two year drought conditions, or the earlier findings might have been related to a migrating plume of contaminants that has now moved off-site. Will EPA be able to so easily discredit the present results also done by EPA approved companies if contamination problems occur in the future?

When the Bowers Landfill was listed on the National Priority List in December, 1982, the conditions at listing by USEPA stated the landfill covered 80 acres (attached). No explanation is given for why this site has dwindled to only 12 acres. In the same USEPA statement, it states that in excess of 7500 tons of chemical wastes were disposed of at the site. Now the present study states that the exact amount of hazardous waste placed in the landfill is unknown, and speculates that it was probably a small percentage of the total disposed material. Even if this is true - and USEPA themselves state they don't know for sure - many hazardous chemicals of the kinds dumped at Bowers have the potential to cause harm to human health and the environment in very small amounts (i.e., parts per billion or million). Flawed logic again. The present report also states that the amount of hazardous waste remaining there is unknown.

The RI has failed to locate and identify contaminants and is proposing containment while at the same time acknowledging that the location and quantity of wastes are unknown. How can one contain something without knowing the location and quantity to be contained? It sounds like a stab in the dark to me. According to an Office of Technology Assessment report of June, 1988, which assessed the Superfund Implementation, one criticism is that, "It is not uncommon to have a multimillion-dollar cleanup decision made without any technical data to support it.."

The Endangerment Assessment is not relevant because of the failure of the RI to identify and locate contaminants. It uses a cancer risk factor of 1 in 10,000. Another OTA criticism states that "Sometimes compromises are made to reduce cleanup cost by allowing a higher risk than the 1 in 1 million cancer risk commonly used in Superfund." With this study, USEPA has compromised our risk and allowed up to a 100 times greater risk than that generally accepted. Why? Again, OTA states that environmental risks seem to take a back seat to constraints imposed by seeking funds from responsible parties.

USEPA and OEPA have chosen to ignore a statement submitted by ACTION at the Community Information Committee meeting on November 2 from our District Soil and Water Conservation representative which presents valid conflicting evidence about groundwater flow. It is based upon his discussions with the Division of Water and a study done in 1975 by Stanley Norris for ODNR, Division of Geologic Survey (#96) about the groundwater situation in the Circleville area, Pickaway County. In the RI, it is determined that groundwater flow under the site is to the west downhill and toward the river. However, the geologic and groundwater conditions on the west side of the river could also be downhill and toward the river since according to Mr. Norris, ..."groundwater moves from the uplands toward the Scioto River valley" and moves in response to the regional gradient. In conclusion, groundwater on the west side of the river could be moving east and downhill to combine with the westerly flow from the east and follow the river toward the south. This would dramatically change the Endangerment Assessment and the potential for contamination of Circleville's well field, 1 1/2 miles south and downstream. The study done for ODNR was much more extensive than the present Remedial Investigation which relied only on conditions in the immediate area of the site.

Our request to do further studies off-site to better determine groundwater flow in lieu of this evidence has been ignored. Thus far, our request for monitoring wells off-site between the landfill and the city's wells has also been ignored. What is the substantiated reason for ignoring this evidence and for not placing these wells?

For the protection of our community and people who live near the landfill, I believe that groundwater monitoring should be done indefinitely on a quarterly basis for priority pollutants and heavy metals as long as there is any question as to the exact location, amounts and kinds of contaminants emanating from the site. There must be provisions for monitoring all potential contaminants emanating from the site and not just the few identified in the RI. This testing should be done on the residential wells near the landfill, Circleville City water wells, and monitoring wells off-site between the landfill and the City water wells in addition to those included in the FS. I don't understand why there is a reduction in monitoring after the first year. How can EPA assume there will be a sudden reduction in risk after the first year with all the unknowns in the RI? It would appear they are relying on public disinterest with time.

The FS states that alternative 4 would comply with current State of Ohio closure standards for solid waste landfills. Since hazardous waste was dumped at Bowers, I would like to know if any of the alternatives comply with current State of Ohio closure standards for hazardous waste facilities. If not, why not?

It would appear that USEPA has conducted a useless study that has no conclusive data. Could this be because the regulators and the responsible parties want to avoid finding contaminants in order to fit what they don't want to do at the site and to avoid putting too much economic stress on the responsible parties? There is something wrong with a system that allows the responsible parties to be directly responsible for the writing of the FS along with the contractors. Any other system would claim this as an obvious conflict of interest.

To further add to this flawed logic, a containment system is being proposed to contain unknown wastes in an unknown amount and unknown location. According to OTA, there is substantial evidence that containment techniques are unproven and unreliable technologies with significant implementation problems. An example is the RCRA clay cap at the Winthrop Landfill site in Maine which failed in September, 1987, before its construction was completed. The OTA also states "impermanent remedies, which provide less protection than permanent ones and do not assuredly meet cleanup goals, are often selected purely because they are cheaper in the short run; in the long run they are very likely to be more expensive." There are various treatment technologies available which could offer a permanent remedy but which do rely on specific identification and location of contaminants. Because of USEPA's inadequate study which failed to do either, permanent remedies which are more expensive in the short-term are not a consideration in the FS. The impermanent remedy proposed for our site is generously estimated to have a life of 30 years. The maintenance and monitoring costs of this remedy which is doomed to fail, have been grossly underestimated. No provision is made as to who will be responsible for such costs including any further cleanup. For that matter, it is not clear who is paying for the proposed remediation. We believe the responsible parties should be financially responsible for any present and future costs - not our state or county or community - and strongly object to any condition in the ROD that would remove that responsibility and liability from them.

OTA also states that "EPA is less responsive to community concerns about a remedy being impermanent than to interests which favor a lower cost impermanent remedy." The incentives for this are to keep the costs low for the responsible parties and the state that has to provide 10% of the cost if the responsible parties don't pay and because EPA wants to distribute available funds as broadly as possible and wants to obtain settlements with responsible parties to reduce calls on Superfund money.

According to OTA, "EPA pushes most ROD's to completion by the end of the fiscal year and this kind of bureaucratic pressure can lead to poor cleanup decisions. Typically, there is less than one month between the end of the public comment period and the issuance of the ROD." I was told by Ms. Nelms that the USEPA wants to make a ROD before the end of March for its quarterly report. It's evident that USEPA does not give public comment much consideration because of the time allotted - 30 days to review and comment on documents that have taken USEPA three years to study and approve. Ironically, even though EPA is familiar with the work and documents, they have rarely taken less than 90 days to review and revise them themselves during the RI/FS. Evidently, I can only assume that EPA is just going through the motions of "acting" like they want our opinion and will give it consideraion.

During this three year process, the only continuity has come from our community. We now have our 4th USEPA community relations coordinator, and the OEPA personnel assigned to our site have also changed at least twice. From the beginning, our Remedial Project Manager, Erin Moran, has not instilled us with the utmost confidence in the USEPA as an agency. At one point in the beginning of the process, we requested a different project director but were assured by Ms.

Margaret McCue, our community relations coordinator at the time, that Ms. Moran was qualified even though she appears hesitant and unsure to respond to specific questions about our site at public meetings. At most meetings, she's appeared indifferent and somewhat sure only when she reads prepared statements. I, therefore, request that the Community Information Committee remain in existence during any remedial action and monitoring to facilitate communication with the community on a regular basis.

In conclusion, I do not believe what USEPA calls a "cleanup remedy" gives overall protection of public health and the environment. USEPA has allowed too many points to be vague and unclear in this FS which we would have appreciated the opportunity to comment on and which are evidently going to be decided by EPA in the ROD. I must agree with Senator Frank Lautenberg, head of the Senate Environment and Public Works subcommittee on Superfund and the environment, that the EPA "instead of acting as a watchdog for industry is acting as their lap dog." The 1988 OTA study verifies that "The Superfund toxic waste dump cleanup program is ineffective, inefficient, and uses pennywise, pound-foolish methods that may have to be reworked at great expense." Bowers Landfill is evidently just another statistic for another OTA study about the ineffectiveness of the Superfund program.

cc: William Reilly, USEPA
Valdus Adamkus, USEPA Region 5
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BOWERS LANDFILL
Circleville, Ohio

Conditions at listing (December 1982): Bowers Landfill, also known as Island Road Landfill, covers 60 acres about 1 mile north of Circleville, Ohio, within the Scioto River floodplain. The site is situated over a very productive aquifer (capable of yields of 1,000 gallons per minute) that supplies both industrial and domestic water. In 1958, a gravel pit started operations on the site. Shortly thereafter, a landfilling operation started in which soil from the nearby pit was used to cover refuse dumped on top of the existing surface. Little is known of the initial years of the landfill, but from 1963 to 1968, it accepted organic and inorganic chemicals and general domestic and industrial refuse. In response to a Congressional inquiry, two local chemical manufacturers stated that in excess of 7,500 tons of chemical waste (physical state and concentrations unknown) had been disposed of at this site. In July 1980, EPA identified toluene and ethylbenzene in water from the landfill. The State worked with the current owner, who hired an engineering firm to evaluate the site. The State reviewed the report and asked for additional information.

Status (July 1983): The State reviewed the additional information from the owner and is awaiting the final Remedial Action Master Plan EPA is preparing. It will outline the investigations needed to determine the full extent of cleanup required at the site.

EPA ID – OHD980509616
CONTACT – ERIN MORAN
Population 11,700
CD – 7
HRS – 50.49

RAMP Development – complete – EPA lead – $39,000
SPENT 2/21/83 – 7/31/83

RI/FS – EPA lead – $400,000 allocated – No ACTION yet

ACTIVISTS CONCERNED WITH TOXICS IN OUR NEIGHBORHOODS
111 Island Road, Circleville, Ohio 43113 1-614-474-1340

MEMO TO: Valdas Adamkus, Director
USEPA Region 5

FROM: Representatives of ACTION

IN RE: Community Information Committee

DATE: February 23, 1989

We have been told by Ms. Barbara Barnett that the continuation of the Bowers Landfill Community Information Committee during the remedial action and ongoing maintenance under the Record of Decision is under consideration. We have also been told that USEPA has considered our committee to be a valuable asset for communication with the community during the Superfund process.

We, therefore, respectfully request that the Bowers Landfill Community Information Committee be continued so that we, the community, may be apprised of all work and developments at the site. The Committee should not be disbanded until a mutually agreed upon date is decided by the Committee that it is no longer needed for community communication.

Beverly Bower
Michael Green
Debra K. Hurd
Patricia A. Mullins
Felicia Harper
Marcella A. Ramey
Jan Byard
Patricia A. Layne
Carol J. Moore

Nancy Cook
Nancy Shellenberger
Cynthia Gillen
Carol Roberts
Arthur L. Robertson
Bruce Robertson
Gary Hill
Elizabeth Turner
Paul W. Turner
Frances Snow
Mary Tracy
Ralph E. Dunkel

6

ACTIVISTS CONCERNED WITH TOXICS IN OUR NEIGHBORHOODS
111 Island Road, Circleville, Ohio 43113 1-614-474-1240

MEMO TO: Valdas Adamkus, Director
USEPA Region 5

FROM: Representatives of ACTION

IN RE: Community Information Committee

DATE: February 22, 1989

We have been told by Ms. Barbara Barnett that the continuation of the Bowers Landfill Community Information Committee during the remedial action and ongoing maintenance under the Record of Decision is under consideration. We have also been told that USEPA has considered our committee to be a valuable asset for communication with the community during the Superfund process.

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Albert J Rose
Ann M Harr
Robert Hite
Freda Hite
Virginia Lewis

ACTIVISTS CONCERNED WITH TOXICS IN OUR NEIGHBORHOODS
111 Island Road, Circleville, Ohio 43113 1-614-474-1240

MEMO TO: Valdus Adamkus, Director
USEPA Region 5

FROM: Representatives of ACTION

IN RE: Community Information Committee

DATE: February 28, 1989

We have been told by Ms. Barbara Barnett that the continuation of the Bowers Landfill Community Information Committee during the remedial action and ongoing maintenance under the Record of Decision is under consideration. We have also been told that USEPA has considered our committee to be a valuable asset for communication with the community during the Superfund process.

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J. L. Chilcote
Jeannette M. Chilcote
[illegible] Marquis

ACTIVISTS CONCERNED WITH TOXICS IN OUR NEIGHBORHOODS
111 Island Road, Circleville, Ohio 43113 1-614-474-1240

MEMO TO: Valdus Adamkus, Director
USEPA Region 5

FROM: Representatives of ACTION

IN RE: Community Information Committee

DATE: February 28, 1989

C: WMD
CC: ORA
FREEMAN
OIA -

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RECEIVED
MAR 06 1989
U. S. EPA REGION 5
OFFICE OF REGIONAL ADMINISTRATOR

ACTIVISTS CONCERNED WITH TOXICS IN OUR NEIGHBORHOODS
111 Island Road, Circleville, Ohio 43113

I AM submitting the additional following comments for the public comment period of the Bowers Landfill Superfund Site.

What is happening to the Bowers Landfill Superfund site? The USEPA and the potentially responsible parties, PPG and DuPont, have just completed a study that cost approximately $700,000 and are unable to give us anymore conclusive information about the site. Volumes of data have been generated and a containment remedy proposed which still ignore potential threats presented by this hazardous waste site. The USEPA has stated that a final cleanup decision will likely be made by March 31.

1. GROUNDWATER FLOW. According to the EPA study, groundwater flow under the site is determined to be to the west toward the Scioto River and, therefore, the Circleville municipal well field located 1.5 miles south is not expected to be affected by potential groundwater contamination.

The District Soil and Water representative, Mark Scarpitt., has presented information from a Department of Natural Resources study which presents valid conflicting evidence about groundwater flow off-site. Since the groundwater moves from the uplands to the Scioto River valley, it is probably combining at the river and flowing south toward the wells and to fill in the depression created by the heavy industrial pumping in the Circleville area. The USEPA did not study groundwater flow outside the immediate area of the site and could be making a serious inaccurate assumption about potential risks to our water supply. They have ignored and have not refuted this evidence and have no plans to install monitoring wells between the site and the city wells.

2. LOCATION OF WASTES. Previous testing at the site showed high levels of contaminants in leachate and groundwater in 1980 and 1981. Present test results generally show low levels of contaminants. The EPA study states that about 40% of the waste was generated by various industries operating in the area, including PPG and DuPont, among others. Responses by PPG and Dupont to a federal survey in 1978 indicate they dumped 1700 and 6000 tons of material respectively. Other local industries evidently did not respond to the survey.

USEPA has not drilled into the site or installed monitoring wells outside the site to determine the location of wastes but is proposing a remedy to contain something. One major area ignored by this study is that this site floods frequently which has presented great potential for contaminant migration since its closure in 1968. In a 1985 meeting with local citizens, Mr. Roger Hannahs of OEPA acknowledged this concern and promised that "OEPA will require testing further out from the site until contaminants are located if not located at the initial test site.." Where is Mr. Hannahs now?

3. METHANE GAS. The EPA study negates any threat from methane gas and the need for any gas venting system since this site has been closed for 20 years. However, specific air tests for methane gas were not performed at the site.

According to an Army Corp of Engineers report (January, 1984), landfill sites can give off methane gas for 50 years or more after closure, especially sites constructed prior to 1970, like Bowers, that had no gas venting systems. The proposed containment with no gas venting could cause methane gas to migrate laterally, carry contaminants to nearby homes and present a public health emergency. An example in our own state is the Industrial Excess Landfill site in Uniontown where methane gas was found to be migrating laterally and under nearby homes.

4. THE SUPERFUND LAW AND CLEANUP STANDARDS. USEPA and OEPA have interpreted the Superfund cleanup standards for Bowers to mean meeting "current Ohio solid waste landfill closure standards". However, solid waste closure laws are not relevant and appropriate for hazardous waste sites.

The Superfund law states that the remedy must comply with any state environmental or facility law that is not less stringent than any federal law for the hazardous substance or release in question. Solid waste closure laws are not relevant and appropriate for hazardous waste sites. This site should not set a precedent for other hazardous waste sites, such as the Bartholmas Landfill, to be treated like solid waste sites.

USEPA and OEPA are using solid waste laws because they are relevant and appropriate for what they want to do to the site. Using solid waste laws for a hazardous waste site is not in compliance with the Superfund law requirement that a first criteria should be the overall protection of the public health and the environment.

In summary, a final cleanup decision cannot rely on a study that makes major assumptions based on speculation or such limited data. USEPA states their remedy addresses a worst case senario situation. A worst case scenario situation would not ignore major conflicting evidence or unanswered areas of concern. It is not surprising that such little or poor oversight of the work at Bowers occurred with the constant turnover of personnel at both USEPA and OEPA. Our community offered a major need for continuity to this process. However, if USEPA had been receptive to our community's suggestions during this study, we could have had a more credible study and be confidant about moving forward to resolve the potential problems presented by Bowers.

For A Cleaner Environment,

Cynthia Gillen

Cynthia Gillen, March 10, 1989

ACTIVISTS CONCERNED WITH TOXICS IN OUR NEIGHBORHOODS
111 Island Road, Circleville, Ohio 43113   1-614-474-1240

PRESS RELEASE - BOWERS LANDFILL SUPERFUND SITE - PROPOSED "CLEANUP"

We believe the only conscientious approach to the potential problems presented by our neighborhood Superfund site, the Bowers Landfill, should be as follows:

First and foremost, a fence around the site and monitoring wells between the site and the City's well field should be installed immediately regardless of any cleanup decision. Common sense tells us these public protective measures should have been installed five years ago prior to any Superfund study.

A final decision about the cleanup at Bowers Landfill should be postponed until serious questions are answered regarding groundwater flow, location and nature of wastes, and methane gas. In addition, any "cleanup" decision made using Ohio solid waste laws is not in compliance with the Superfund law requirement that protection of the public health and the environment should be a first priority. Solid waste laws are not relevant and appropriate for hazardous waste sites.

We believe permanent cleanup treatments could be considered if these major areas of concern were addressed. This request is not made lightly. We want a final solution as much as anybody. The problem is that there are many reasons to question the sensibility of EPA's plan. We are not questioning EPA's decision just to be difficult and our position is not unique as is evident in the Office of Technology Assessment study about the ineffectiveness of the Superfund program.

We feel strongly that EPA should answer all intelligent questions and overcome the many contradictions in their study rather than leave us with a faulty "cleanup" at Bowers. Nobody in this county wants to be fighting this battle again in 15 years. EPA's proposed remedy does not give us the least risk possible and we think their decision is influenced by cost. Pickaway Countians should not sacrifice their quality of life for economics.

We have not heard from anyone in the County who likes the EPA's proposed decision. Senator Jan Long, the Pickaway County Commissioners and several City officials and councilmen have similar concerns and are submitting their statements to USEPA. Ohio EPA representatives even agreed that all our concerns are valid in a meeting on Tuesday with Senator Jan Long and ACTION representatives. In fact, they stated their comments about the proposed plan would include similar concerns. However, it appears they are resigned to working within the inadequacies and politics of the system and succombing to USEPA's haste to meet its half-year report deadline of March 31, 1989.

We think USEPA should reassess their priorities - a first being to address adequately the cleanup of Superfund sites. We think OEPA should reassess their priorities - a first being to insist that the Superfund work as the law intended.

As Pickaway County residents, we will not sacrifice our environment to become another statistic for another study about the ineffectiveness of the Superfund program. We will not stand by while poor decisions cost us misery and money in the future.

Thursday, March 16, 1989

ACTIVISTS CONCERNED WITH TOXICS IN OUR NEIGHBORHOODS
111 Island Road (rear), Circleville, Ohio 43113
1-614-474-1240

ACTION is a public interest environmental organization formed in September, 1984, for the specific purpose of working on the Bowers and Barthelmas Landfills which threaten to contaminate the Teays Aquifer, our water supply, and the Scioto River. Since ACTION's origin, we have become involved in addressing all potential environmental problems within our county. ACTION's projects and services include but are not limited to the following: Bowers Landfill Superfund site, Barthelmas landfill, sewage/sludge application on farmland, water and soil monitoring in coordination with the Student Environmental Health Project of Vanderbilt University, PPG's regional hazardous waste incinerator, PPG's plant site groundwater contamination, solid waste management and recycling, school programs, and the ACTION office which has extensive environmental resources including news articles, books, videotapes, magazines, legislative bills, government publications, and newsletters from other environmental organizations.

ACTION has worked hard to bring a greater awareness to our community of our environmental problems and the many threats to the county's air, water and soil. By attending environmental conferences, speaking to the young people in the schools who will eventually inherit these problems, working with the EPA, industry and other government officials for more citizen participation, and speaking to area organizations, we think we are making a significant impact for good in Pickaway County.

ACTION's members are highly motivated and dedicated to cleaning up existing problems and from preventing other problems from ever materializing by making government responsible to those people who are most affected by pollution. Environmental impacts need to be a major consideration when planning growth for our community in order to not jeopardize our present or future economy. Industry can be a responsible and considerate neighbor by our insisting that the laws be enforced and that new laws be passed that give incentives for elimination of both solid and hazardous wastes by safe methods such as waste exchange, neutralization, source reduction, bacterial treatment, and recycling.

ACTION NEEDS YOUR HELP! We need you in this immense task. We need your time and contributions to continue and further our work.

I WANT TO JOIN A.C.T.I.O.N.

Complete this form and mail to ACTION, 111 Island Road, Circleville, Oh 43113
(To be a voting member, you must be a Pickaway County resident.)

Name____

Address____

Phone______________________Confidential Membership (check here) _____

Membership fee per year - Please make checks payable to ACTION.
(Includes three newsletters a year)

Single..................$10

Family.................$15.00

Sponsor.................$25

Benefactor........$50 & above

Corporate..............$200

Retired, Student or Limited Income..........................$ 5.00

I want to be an ACTION volunteer (check here) _____

4

ACTIVISTS CONCERNED WITH TOXICS IN OUR NEIGHBORHOODS
111 Island Road, Circleville, Ohio 43113 1-614-474-1240

What is happening to the Bowers Landfill Superfund site? The USEPA and the potentially responsible parties, PPG and DuPont, have just completed a study that cost approximately $700,000 and are unable to give us anymore conclusive information about the site. Volumes of data have been generated and a containment remedy proposed which still ignore potential threats presented by this hazardous waste site. The USEPA has stated that a final cleanup decision will likely be made by March 31.

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Thurer

Plan to clean up Circleville dump prompts doubts

Some wonder how city water supply might be affected

By Don Baird
Dispatch Staff Reporter

CIRCLEVILLE, Ohio — Some people here, including Mayor Michael E. Logan, are questioning a federal cleanup plan proposed for a controversial toxic waste dump.

The U.S. Environmental Protection Agency will seek public comments on the plan at a 7 p.m. hearing Tuesday in Circleville High School.

The EPA wants to cap the abandoned Bowers Landfill with 4 feet of clay and topsoil, fence the site and monitor ground water with test wells. The landfill is within 2 miles of Circleville's four municipal water wells.

The EPA has estimated the cleanup would take 10 months and cost $4.2 million.

THE EPA once rated the toxicity of the landfill at only slightly lower than that of the infamous Love Canal area near Niagara Falls.

Since 1983, the Bowers Landfill has been on the Superfund National Priorities List of the worst uncontrolled and abandoned hazardous waste sites.

Logan wants to know who will pay to monitor the ground water after the EPA finishes the cleanup. He also questions the EPA's assertion that the landfill poses no threat to city wells.

"It could cost us $30,000 a year to monitor those (test) wells," Logan said. "We want them monitored, but the city doesn't need to absorb the cost."

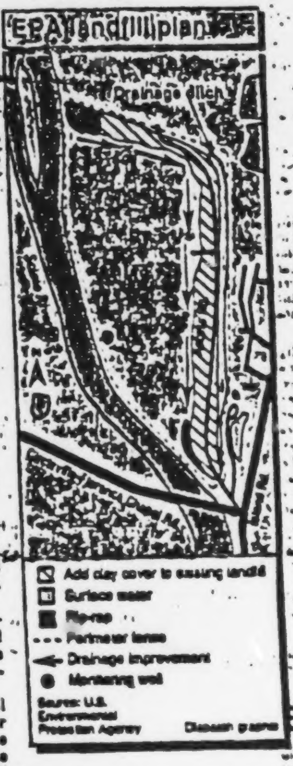
The EPA report concludes that municipal wells are safe from contamination because ground water from the landfill flows west toward the Scioto River, instead of south toward the wells.

"I don't think anybody understands that aquifer," Logan said.

The mayor said he is withholding judgment on the EPA plan. "I want to see what comes out of the meeting," he said.

Physician Gary L. Gillen and others in a citizens group, Activists Concerned with Toxics in Our Neighborhoods, have filed a written objection, saying the plan is inadequate. They plan to speak at the hearing.

"It falls short," Gillen said. "Everybody who's looked at these problems prefers some treatment that would permanently protect a site."


EPA landfill plan

Source: U.S. Environmental Protection Agency

THE EPA plan does not call for removing all toxic material, and it would not protect the landfill from flooding, which occurs annually, he said. A dike should be built around the landfill, he said.

Bowers Landfill is northwest of Island and Circleville-Florence Chapel roads and west of Rt. 23. It opened in 1958 and closed in 1968.

Gillen accused the EPA of attempting "to minimize hazards to avoid frightening local residents and to minimize problems to avoid putting too much economic stress on the responsible parties."

"Any containment plan is doomed to fail, and ... such plans must be reinforced to the maximum and monitored carefully to discover the failure when it occurs," he said.

The EPA said, "the overall [illegible] is low."

Circleville folks rap EPA landfill plan

3-1-89

By Don Baird
Dispatch Staff Reporter

CIRCLEVILLE, Ohio — The federal government's proposed program to clean up a toxic waste dump at this city's western edge was criticized by Pickaway County residents yesterday as poorly planned and inadequate.

"I'm pitifully disappointed," said John Stolarz of Circleville.

When Stolarz asked whether others among the 68 people who showed up to comment on the plan felt the same way, most raised their hands and some applauded or cheered.

Stolarz spoke at a public hearing held by the U.S. Environmental Protection Agency at Circleville High School yesterday to measure the community's acceptance of its plan to cap the abandoned Bowers Landfill with 4 feet of clay and topsoil.

SINCE 1983, the landfill has been on the Superfund National Priorities List as one of the nation's worst uncontrolled and abandoned hazardous waste sites.

The landfill is on 12 acres a mile northwest of Circleville and about 25 miles south of Columbus.

Most people who spoke criticized the EPA's choice of remedies, which carries an estimated price tag of $4.2 million.

The EPA chose its cleanup plan, which calls for fencing Bowers Landfill and monitoring ground water with at least 18 test wells, from among nine alternatives — from zero cost for taking no action to more than $13 million for a more expensive plan that included a flood protection dike.

The preferred plan also includes restricting access to the landfill, management of surface debris, improvement in erosion control, flood protection and drainage, and using clay to cover the landfill.

STOLARZ SAID he thought the toxic wastes dumped at the landfill should be dug out and destroyed or treated to render them harmless.

The landfill, northwest of Island and Circleville-Florence Chapel Roads, opened in 1958 and closed in 1968. It accepted chemical and industrial waste as well as domestic refuse.

In 1985, the EPA identified PPG Industries and E.I. du Pont de Nemours & Co. as partly responsible for contamination in the landfill.

Recent tests at the site indicate "the overall risk posed by the site is low," an EPA report said. Earlier tests rated toxicity of the landfill at only slightly lower than that of the infamous Love Canal near Niagara Falls, N.Y.

Cynthia Gillen, a spokesman for Activists Concerned With Toxics in Our Neighborhood, said the EPA plan leaves too many questions unanswered, including the question of what happened to contaminants measured in earlier tests.

"Basically, I think they're going through the motions," Gillen said. "They haven't been convincing."

SHE SUGGESTED toxic material detected earlier may have leaked from the landfill and be making its way via ground water to Circleville's municipal wells, fewer than 2 miles south of the landfill.

She said an EPA consultant admitted during the hearing that he could not rule out such a possibility.

She also said the EPA admits that if Bowers Landfill had operated after new laws had been put into effect, it would have been subject to stricter cleanup requirements as a hazardous waste site instead of being treated as a solid waste landfill.

"In written comments submitted to the EPA, Gillen said, "It would appear that U.S. EPA has conducted a useless study that has no conclusive data."

Comments from Government Agencies and Officials

9

[illegible] City Council
Tuesday 7 March 1989

3/28 USEPA - CHS

To: The President and members of City Council,
Circleville, Ohio

Whereas, in the opinion of many concerned informed citizens, it has not been conclusively demonstrated that the well field which supplies water for the City of Circleville is completely safe from contamination by hazardous wastes deposited in the Superfund Site known as the Bowers Landfill, I strongly urge that the President of City Council write the Ohio and U.S. Environment Protective Agencies expressing our concern, and requesting that adequate ground monitoring wells be placed in locations appropriate to assuring protection of our water supply, i.e. between our well bed and the Landfill, and that this action be taken as part of that remedial action which is eventually selected.

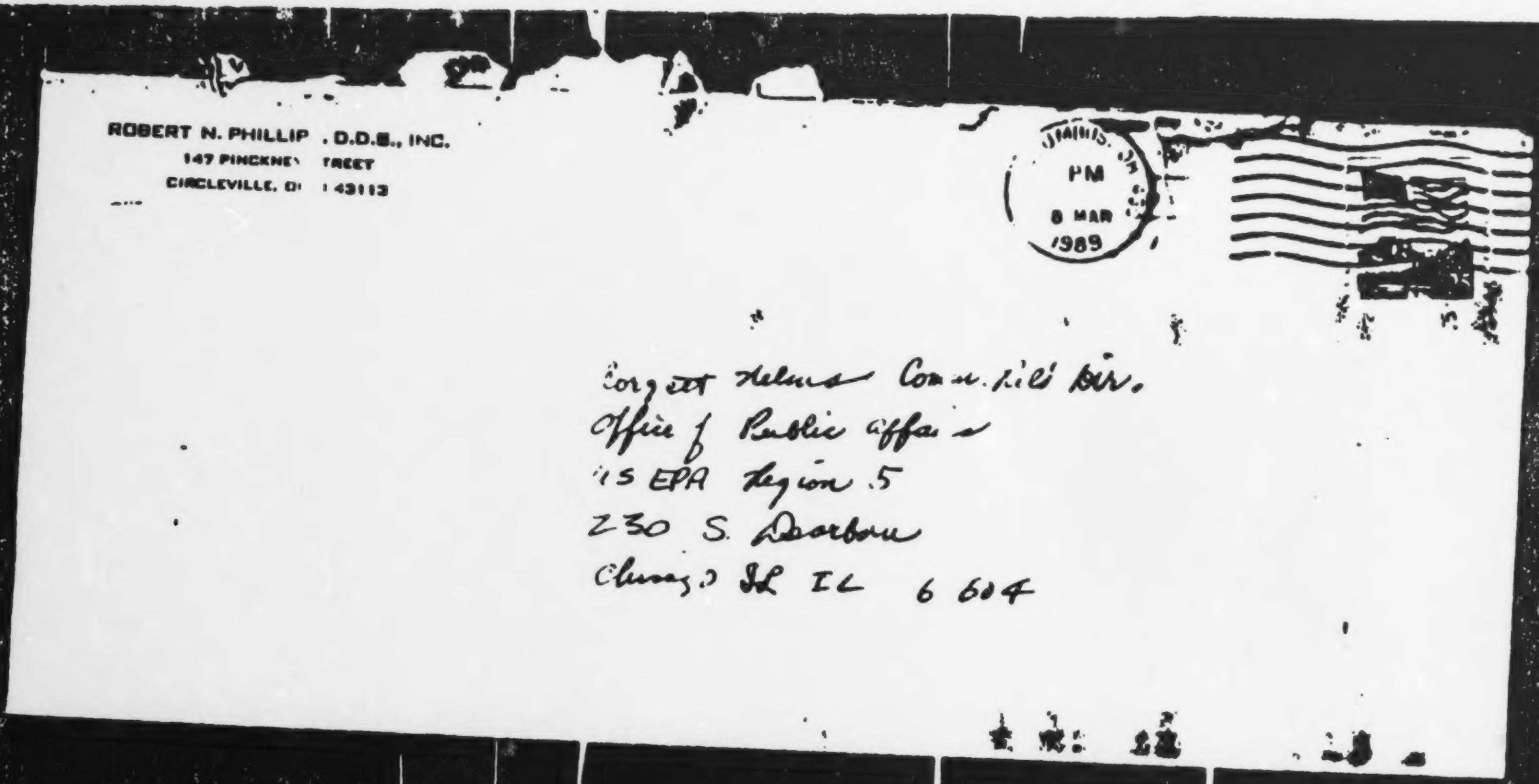
Such written comment must be submitted to the U.S. EPA by March 16, 1989.

Respectfully submitted,

Robert N. Phillips
Councilman, First Ward

Georgette Nelms
Community Relations Coordinator
Office of Public Affairs

U.S. EPA Region 5
230 South Dearborn
Chicago, Il 60604



ROBERT N. PHILLIP , D.D.S., INC.
147 PINCKNE TREET
CIRCLEVILLE, O 43113

PM
8 MAR
1989

Corgett Helms Comm. Rel. Dir.
Office of Public affairs
US EPA Region 5
230 S. Dearborn
Chicago Ill IL 6 604

Georgette Nelms
Community Relations Coordinator
U.S. EPA Region 5
230 S. Dearborn Ave.
Chicago, Ill. 60604

March 9, 1989

Dear Ms. Nelms:

The point of this letter is not necessarily to communicate my disagreement over the method in which the EPA has recommended to "remedy" the problem at the site of the Bowers Landfill as much as it is to express my displeasure over the manner in which the alternative was presented to local citizens.

I feel the EPA was ill-prepared to fully respond to many of the questions posed by members of the community who attended the public information meeting on Feb. 28, 1989 at Circleville High School.

As a Circleville city councilman, I feel taxpayers deserve and should expect better response from governmental bodies than what they received from the EPA. In particular, inquiries concerning the decision not to physically remove waste from the site were met with the response that total removal of the waste was simply not one of the options investigated.

The remedy recommended by the EPA has some merit but I feel it doesn't go far enough to provide for the future safety of the 13,000+ citizens who depend on the Circleville water supply. Many members of this community, including myself and other councilmen, feel additional monitoring precautions should be included in your remedy.

One such precaution would be to locate ground water test wells at strategic points between the landfill and Circleville's water field. As your plan presently states, most test wells are in the immediate area of the landfill.

I realize the EPA becomes involved in battles on many fronts when making decisions that may satisfy some groups but could cost others millions of dollars. Nevertheless, it is important not to misjudge the impact your decision will have on those who live and raise their families here. It is hoped your final solution reflects at least some of this community's interests.

Sincerely,

David M Crawford

David M. Crawford
Circleville City Councilman
431 N. Court St.
Circleville, Ohio 43113

Jan Michael Long
State Senator

Ohio Senate
17th District

MEMORANDUM

TO: Ohio Environmental Protection Agency
United States Environmental Protection Agency

FR: Jan Michael Long
State Senator
17th District Ohio Senate

RE: Bowers Landfill Super Fund Sight/Public Comment

DATE: March 14, 1989

Thank you for the opportunity to allow me to submit to you this date my public comment for the record and to be reviewed by the respective Environmental Protection Agencies in their consideration of rendering a record of decision on the closure and cleanup of the Bowers Landfill Super Fund Sight. I submit these comments not only as the State Senator who represents the geographic area known as Circleville and Pickaway County in the 17th Ohio Senate District, but also as a citizen of the City of Circleville.

While our community and indeed our state is most interested in forging a remedy to the Bowers Landfill problem, all of us want to assure ourselves that such a cleanup is one that is safe, protects the environment for present generation, as well as future generations, and also is one that we will not have to revisit in the near future. Based on these underlying premises, my public comment is a request for the US EPA region 5 and the Ohio Enviornmental Protection Agency to withhold or postpone any records of decision on the Bowers Landfill closure until some major areas of concern are addressed and satisfactorily examined by a thorough study of additional information necessary to make a permanent environmentally sound decisions.

Jan Michael Long
State Senator
Ohio Senate
Statehouse
Columbus, OH 43266-0604
614-466-8156

Scott E. Ellsar
Legislative Aide
Pam Spangler
Secretary

Committees:
Education and Retirement
(Ranking Minority Member)
Finance
Highways and Transportation
Legislative Ethics Committee

15

Having attended the hearing on the public comment and question session some two weeks ago, there were some matters that came to my attention and that raised some concerns on my part. For example, the Bowers landfill is perhaps one of the most toxic and hazardous in this state, if not in the United States. Yet, the closure standards that would be applied to the Bowers Landfill would be those closure requirements that govern the closure of a solid waste site. It is my understanding that this is acceptable because of the technical requirements of the law as it relates to the time of the last use of Bowers Landfill. Certainly, if the landfill contains materials that would qualify it as a hazardous or toxic waste landfill in 1989, then it seems to only make sense that the closure should be made pursuant to the guidelines and regulations governing hazardous waste landfills. The mere fact that termination of use was some two decades ago should not remove the closure from the hazardous waste closure requirements.

Secondly, it was my understanding at the public hearing that the alternatives for closure need only satisfy a thirty-year life span requirement. From the public safety standpoint, as well as from the public funding standpoint, it seems as though a permanent solution should be pursued and not one that may require additional closure remedies in twenty or thirty years. As a legislator who is most concerned with funding issues, I can assure you that I would applaud efforts that deal with one time permanent costs, as opposed to future potential unknown monetary costs for intermedial work.

Next, I would like to comment on areas that appear to not have been thoroughly examined in the initial alternative proposals. The issues that should be more thoroughly studied and further data collected, would be issues dealing with the groundwater flow outside the immediate area of the site. Perhaps the installation of monitoring wells between the site and the city wells would adequately address this issue. Additionally, there appears to have been limited if any, testing at areas outside the site to determine the location of any migrating waste. Before we can talk about total containment, it would be helpful to fully understand the extent of the contamination.

Finally, the threat of methane gas migration seems to be one that has not been adequately examined in the process of formulating these porposals. The question of the absence of gas venting systems to prevent lateral migration of methane gas should be addressed.

Thus, considering all of the unknown and unanswered variables in this very complex problem, I would strongly urge the US EPA to postpone any record of decision until these questions are satisfactorily examined and answered.

Again, thank you for allowing me the opportunity for this additional public comment.

The City of Circleville
DEPARTMENT OF PUBLIC UTILITIES
114 WEST FRANKLIN STREET
P O BOX 209
CIRCLEVILLE, OHIO 43113
TELEPHONE (614) 477-2551

MICHAEL E. LOGAN
MAYOR

ATWOOD P. JONES, P.E.
DIRECTOR OF PUBLIC SERVICE

March 15, 1989

Ms. Erin Moran
Remedial Project Manager
Remedial and Enforcement Branch (EHS-11)
US Environmental Protection Agency
230 South Dearborn Street
Chicago, IL 60604

Dear Erin:

This letter will serve to notify the USEPA of the City of Circleville's comments on the "Feasibility Study for the Bowers Landfill, Circleville, Ohio" dated February 3, 1989.

On page 1-5 of the report the first paragraph states "According to information on file with the OEPA, the majority of waste materials deposited on the site consisted of residential refuse collected by the City of Circleville as well as by several private haulers in the Circleville area." That part of the statement referring to refuse being collected by the City of Circleville is incorrect. The City of Circleville has never collected residential refuse with City crews and equipment nor has the City contracted such work to private contractors. Residential refuse collection within the City of Circleville has been and continues to be the responsibility of each individual property owner and as such each property owner makes arrangements with individual haulers to haul their trash.

On page 3-38 under the paragraph entitled "Erosion Control and Drainage Improvements" the report discusses the installation of sheet-piling protection at the north end of the landfill adjacent to the Scioto River in order to provide containment for the stone riprap to be installed at that location. The City's position is that both the sheetpiling protection and the amount of riprap to be installed is not sufficient given the fact that during severe floods the entire north leg of the landfill is at risk. According to a report prepared in October 1966 by the Department of the Army, Huntington District, Corps of Engineers entitled "Flood Plain Information, Scioto and Olentangy Rivers, Ohio, Main Report", the 100 year flood elevation at the Bowers Landfill site is approximately 675 feet above mean sea level (msl). This 100 year flood will be over the top of the existing landfill by approximately 10 feet. The City requests that the sheetpiling protection be extended to the east on the up river side and that the length of the riprap be extended considerably to protect the north leg of the landfill that protrudes out into the flood plain area.

The south end of the landfill is designed to have stone riprap on the end that protrudes into the floodplain. Since this area is immediately adjacent to the Florence Chapel Road bridge (Red River Bridge) over the Scioto River the entire flow of water in the Scioto River must past underneath this bridge and severe scouring problems may occur to the edge of the landfill at this location under severe flood conditions. The City's position is that sheetpiling needs to be installed in this area to prevent the undermining of the riprap in this area and the riprap itself needs to be extended considerably in order to provide adequate protection in this area.

The final major area of concern of the City of Circleville with the report involves the lack of specific recommendations for a ground water monitoring system that will serve to protect the City of Circleville's public water supply. The City's existing well field is located adjacent to the water treatment plant approximately 1 1/2 miles south of the Bowers Landfill. Approximately eight years ago the City of Circleville undertook an engineering investigation to determine whether a future well field could be located at the old pumping station site on the west side of the Scioto River off of River Road. The site is identified on Drawing Number 1 Vicinity Map as "Pumping Station". The City's report indicated that the area around the old pumping station, which is currently still owned by the City of Circleville would serve adequately as a future well field site for the Circleville water treatment plant. There exists a 16" watermain that runs from the old pumping station site to the current water treatment plant on Island Road that could transmit raw water to the treatment plant.

The City feels that it is absolutely essential that adequate monitoring for both of these locations is necessary in order to adequately protect the City of Circleville's public water supply. The City is of the opinion that additional monitoring wells need to be installed off site of the Bowers Landfill and an appropriate monitoring program be devised so that these two sites would be adequately protected from any migration of hazardous materials from the Bowers Landfill. I would suggest that the construction of additional monitoring wells and and an adequate monitoring program be developed as part of the work to be done on whichever alternative the USEPA selects as to the proposed solution to the problems at Bowers Landfill. The City of Circleville will want to be involved in the development and review of such an addendum to the proposed plan.

If you have any questions on the above matters, please do not hesitate contacting me.

Very truly yours,

Woody

Atwood P. Jones, P.E.
Director of Public Service

City of Circleville
MICHAEL E. LOGAN, MAYOR
CITY HALL, 127 SOUTH COURT STREET
CIRCLEVILLE, OHIO 43113-1611
TELEPHONE (6[illegible]) 477-2551

March 15, 1989

Ms. Erin Moran
Remidial Project Manager
Remidial and Enforcement Branch (EHS-11)
US Environmental Protection Agency
230 South Dearborn Street
Chicago, IL. 60604

Dear Ms. Moran:

This letter is regarding the City of Circleville's comments on the Feasibility Study for Bowers Landfill, Circleville, Ohio dated February 3, 1989.

The first paragraph on page 1-5 stating the majority of waste materials deposited on the site consisted of residential refuse collected by the City of Circleville as well as by several private haulers in the Circleville area is not correct. I would like to emphasize the City of Circleville does not collect residential refuse with City crews and vehicles nor does the City contract such work. Residential refuse collection within the City of Circleville has been and continues to be the responsibility of each individual property owner and each individual property owner makes arrangements with private haulers to haul their refuse.

The City's position concerning erosion control and drainage improvements is that both the sheetpiling protection and the amount of riprap to be installed is not sufficient due to the fact that during severe flooding the entire end of the dike is at danger. The City requests that the sheetpiling protection to be extended to the east on the up river side and that the length of the riprap to be extended extensively to protect the north end of the landfill that protrudes out into the flood plain area.

CIRCLEVILLE OHIO IN 1836

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Since the south end of the landfill is immediately adjacent to the Florence Chapel Road bridge over the Scioto River, the entire flow of water in the Scioto River must pass beneath this bridge and serious scouring problems may occur to the edge of the landfill at this location under serious flood conditions. The City's viewpoint is that additional sheetpiling needs to be installed in this area to prevent the undermining of the riprap and the riprap itself needs to be extended considerably in order to provide adequate protection in this area.

A major interest of the City of Circleville concerns the lack of specific recommendations for a ground water monitoring system that will serve to protect the City of Circleville's public water supply. The City's existing well field is located adjacent to the water treatment plant approximately 1 1/2 miles south of the Bowers Landfill. Approximately eight years ago the City of Circleville undertook an engineering investigation to establish whether a future well field could be located at the old pumping station site on the west side of the Scioto River, off of River Road. The site is identified on drawing number 1 on the Vincinity Map as "Pumping Station". The City's report implied that the area around the old pumping station, part of which is currently still owned by the City of Circleville would serve adequately as a future well field site for the Circleville water treatment plant. There exists a 16" watermain that runs from the old pumping station site to the current water treatment plant on Island Road.

I would like to stress that the City is extremely concerned in having adequate monitoring for both of these locations in order to sufficiently protect the City of Circleville's public water supply. The City strongly suggests that monitoring wells be installed off site of the Bowers Landfill in such a manner that would detect any migration of hazardous materials in the direction of these facilities.

My opinion is that additional monitoring wells need to be drilled and an appropriate monitoring program be devised so that these two sites would be adequately protected from any migration of materials from the Bowers Landfill. I would suggest that the construction of additional monitoring wells and adequate monitoring wells and a sufficient monitoring program be developed as part of the work to be done on whichever alternative that the USEPA selects as to the suggested solution to the problems at Bowers Landfill. The City of Circleville will want to be involved in the review and development of such an addendum to the proposed plan.

If you should have any questions regarding the above concerns, please do not hesitate contacting me.

Very truly yours,

Michael E Logan

Michael E. Logan
Mayor of Circleville

The Proposed Plan also does not adequately describe the ground water monitoring program that will be established as part of the preferred remedial alternative. Therefore, the ROD needs to specify which wells will be sampled, how often the wells will be sampled, and for what parameters the wells will be sampled. The wells should be sampled on a monthly or bimonthly basis for the first year and on a quarterly basis for the next two to five years. If the levels of contamination in the ground water do not increase over this time period, then a reduction in the frequency of sampling may be considered. The samples from the wells should be analyzed for all target compounds each time the wells are sampled.

The installation of additional ground water monitoring wells is also necessary to develop a monitoring well system that will adequately detect potential future releases of contaminants from the site. Well clusters should be installed in the following locations:

1. Between Well Location 5 and Well Location 6.
2. Between Well W-10 and the bend of the landfill.
3. Offsite, between the landfill and the Circleville municipal well field.

Because of flooding of the Scioto River and uncertainty about the amount, composition, and mobility of wastes in the landfill, conditions at Bowers Landfill are likely to change. In order to fully comply with State law and protect the environment, the ROD must have a contingency plan that can be easily and rapidly implemented and a ground water monitoring system that will adequately detect any potential future releases of contaminants.

Sincerely,

Deborah J. Strayton

Deborah J. Strayton
Office of Corrective Actions
Central District Office

cc Erin Moran, U.S. EPA, Region V
Maury Walsh, OEPA, Deputy Director
Dave Strayer, OEPA, OCA
Kathy Davidson, OEPA, OCA
Cindy Hafner, OEPA, Legal
Jack Van Kley, OAG
Chris Korleski, OAG
Jan Michael Long, Ohio Senate

COMMISSIONERS
GEORGE H. HAMRICK
JOHN F. FISSELL
RUTH NEFF

CLERK ADMINISTRATOR
TERRENCE J. BERRIGAN
Telephone 614-474-6093
614-474-6094
614-474-6095

PICKAWAY COUNTY
BOARD OF COUNTY COMMISSIONERS
ROOM 5. COURT HOUSE
CIRCLEVILLE, OHIO 43113

March 15, 1989

Georgette Nelms
Office of Public Affairs
Chicago, Illinois 60604

Ms. Nelms,

After reviewing the EPA's planned response to the Bowers Landfill problem, we feel it is our obligation to offer our comments for the public record.

Many citizens of Pickaway County have devoted a great deal of time and effort in studying the technical aspects of the EPA's studies and recommendations.

They have presented to us their concerns and after considering the information, we would strongly request the USEPA Region 5 and the Ohio EPA to postpone a Record of Decision until the following four major areas of concern are reconsidered:

1. We have received conflicting accounts as to the direction of the groundwater flow. If the USEPA did not study groundwater flow outside the immediate area of the site, an inaccurate assumption of the potential risk to our water supply could be made.

2. According to reports, tests to discover the contaminants have generally been restricted to around the site. Without testing larger areas around the landfill, no evidence of off-site migration could be determined.

3. We have been informed that landfills can exhaust mathane gas as a by-product. If so, without a gas venting system, surrounding homes would be exposed to a risk of methane gas contamination.

4. Concerns have been raised that the EPA is planning to use cleanup standards based on "current Ohio solid waste landfill closures standards." We also share those concerns as solid waste closure laws are not appropriate for hazardous waste sites.

COMMISSIONERS
GEORGE H. HAMRICK
JOHN F. FISSELL
RUTH NEFF

CLERK-ADMINISTRATOR
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PICKAWAY COUNTY
BOARD OF COUNTY COMMISSIONERS
ROOM 5, COURT HOUSE
CIRCLEVILLE, OHIO 43113

March 15, 1989
Page 2

In closing, the Pickaway County Board of Commissioners urges you to not commit to one plan of action until all these matters have been publicly addressed in greater detail.

Sincerely,

THE PICKAWAY COUNTY BOARD OF COMMISSIONERS

John F. Fissell
Ruth E. Neff
George H. Hamrick

jm

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AFTER FIVE DAYS, RETURN TO
PICKAWAY COUNTY
BOARD OF COMMISSIONERS
BASEMENT, COURT HOUSE
CIRCLEVILLE, OHIO 43113

24

COLUMBUS, OH
PM
15 MAR
1989

SAVE
YOUR VISION
WEEK

Georgette Nelms
Community Relations Coordinator
USEPA Region 5
Office of Public Affairs
5PA-14
230 South Dearborn Street
Chicago, Illinois 60604

OhioEPA

State of Ohio Environmental Protection Agency

Central District Office
P O Box 1049 1800 WaterMark Dr
Columbus, Ohio 43266-0149
(614) 644-2055

Richard F Celeste
Governor

March 15, 1989

RE: Bowers Landfill

Georgette Nelms
Office of Public Affairs (5PA-14)
U. S. EPA, Region V
230 South Dearborn Street
Chicago, Illinois 60604

Dear Ms. Nelms:

Enclosed are the originals of the comment letters that Ohio EPA sent to you by FAX on March 15, 1989. These letters include Ohio EPA's comment letter on the Proposed Plan and State Senator Jan Michael Long's comment letter on the Feasibility Study and the Proposed Plan for Bowers Landfill.

If you have any questions, please contact me at (614) 644-2055.

Sincerely,

Deborah J. Strayton

Deborah J. Strayton
Office of Corrective Actions
Central District Office

Comments from Potentially Responsible Parties

2 380 Ch-684 REV 11-87

DU PONT

E. I. DU PONT DE NEMOURS & COMPANY
INCORPORATED
CIRCLEVILLE, OHIO 43113

March 15, 1989

Ms. Georgette Nelms
Community Relations Coordinator
Office of Public Affairs
US EPA Region 5
230 South Dearborn
Chicago, Illinois 60604

Dear Ms. Nelms:

Enclosed is a copy of the remarks I made regarding the Bower's Landfill during the public meeting held at the Circleville High School, 380 Clark Drive, Circleville, Ohio on March 28, 1989.

If you have any questions, please contact me.

Sincerely,

R. E. Berlin
Site Services Superintendent
Du Pont Circleville Plant

JKS008/ah
Enclosure

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CONTACT:

Ron Berlin, Site Services Superintendent
Du Pont Circleville Plant
Phone: 614-474-0240

* * * * * * *

DU PONT STATEMENT ON BOWERS LANDFILL

From 1965 to 1968 we disposed of Mylar® polyester scraps and rolls that didn't meet customer specification in the landfill. We also disposed of Mylar® polymer, which amounts to the same material solidified in large pieces. Mylar®, as you probably already know, is a thin sheet of film with a variety of everyday uses such as food wrap and packaging. Chemically, Mylar® is the same as the polyester fiber that is in much of our clothing.

Small quantities of materials such as paint, degreasers, lab chemicals, and maintenance supplies have gone to the landfill, but the bulk of our materials in the landfill is Mylar®.

When concerns developed over the landfill, we felt it was important that a study be done to determine whether the landfill presented any threat to health or the environment. For that reason, we agreed along with PPG to jointly fund the $700,000 feasibility study.

The feasibility study lists nine alternatives for dealing with the landfill. EPA has already stated that it prefers Alternative No. 4. We feel Alternative No. 3 is the more appropriate method to address any concerns about the landfill. Let me remind you of the provisions of the two alternatives. Both of the alternatives call for groundwater monitoring, restricting use of and access to the site, managing surface debris, and improving erosion control, flood protection and drainage.

In addition, Alternative No. 3 calls for areas of the existing landfill cap which shows erosion to be identified and repaired with natural clay soil. Additional clay would be filled in to prevent surface water from forming in ponds. Maintenance and improvements to the existing vegetation cover would be made to inhibit erosion. The cover would be inspected regularly for st[illegible] integri[illegible]. Alternative No. 4, pre[illegible] by the EPA, calls for cutting down trees and similar vegetation that have grown up over the last 20 years and installing a new clay cap over the landfill.

(JHS004/eh)-1
2/28/89

While the cost of Alternative No. 4 is higher than that of Alternative No. 3, our main concern is not the cost but the environmental intrusion that Alternative No. 4 might cause. In our opinion, removing existing vegetation does not appear to be warranted; will disrupt the ecological system currently in place; will have a detrimental effect on the stability of the fill side slope; and will create a continuing, long-term maintenance problem.

The remedial investigation indicates that there is no continuing release of contaminants from the site. The study does not indicate that the landfill presents a substantial threat which would require the severe remedial measures called for in Alternative No. 4. Based on currently available data, securing the site and providing regular, long-term monitoring is all that is called for at the site. In the unlikely event that monitoring indicates that a problem is developing, prompt remedial action can be taken.

Although there is no imminent health or environmental risk posed by the site, we feel it is prudent to monitor the site to assure that there is no future problem. We feel that Alternative No. 3 is a more than adequate method to assure that the health and environment of the community is protected.

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APPENDIX B

COMMUNITY RELATIONS ACTIVITIES AT BOWERS LANDFILL

COMMUNITY RELATIONS ACTIVITIES AT BOWERS LANDFILL

Community relations activities conducted at Bowers Landfill to date have included the following:

- U.S. EPA conducted community interviews with local officials and interested residents (March 1983).
- U.S. EPA established an information repository at the Pickaway County District Library in Circleville, Ohio (July 1984).
- U.S. EPA held a public meeting to discuss and solicit public comments on the consent order (March 1985).
- U.S. EPA held a comment period on the consent order (February 22 to March 25, 1985).
- U.S. EPA prepared a community relations plan (May 1985).
- U.S. EPA developed a response to public comments (responsiveness summary) on the consent order (July 1985).
- U.S. EPA held a public meeting to discuss the responsiveness summary (August 1985).
- U.S. EPA distributed an update on activities at Bowers Landfill (November 1985).
- The Bowers Landfill Information Committee was established. Twelve meetings were held before and during the remedial investigation and feasibility study (RI/FS) (November 1985; January, March, June, August, and October 1986; March, June, and September 1987; and January, June, and November 1988).
- U.S. EPA developed and distributed a glossary and other materials to assist people with non-technical backgrounds in understanding sampling results presented in RI technical memoranda (May 1987).
- U.S. EPA developed and distributed a fact sheet on applicable or relevant and appropriate requirements (ARARs) (April 1988).

- U.S. EPA developed and distributed a fact sheet explaining the preliminary results of the RI (June 1988).

- U.S. EPA developed and distributed a fact sheet explaining the final RI results and the results of the endangerment assessment (EA) (September 1988).

- U.S. EPA held a public meeting in Circleville to discuss results of the RI and EA. Approximately 70 people attended (September 14, 1988).

- U.S. EPA released the FS report and Proposed Plan for public review and comment (February 1989).

- U.S. EPA held a public comment period on the FS and Proposed Plan (February 14 to March 16, 1989).

- U.S. EPA prepared and distributed a fact sheet on the FS and Proposed Plan (February 1989).

- U.S. EPA held a public meeting in Circleville to present the results of the FS, describe the Agency's preferred remedial alternative for Bowers Landfill, respond to citizens' questions, and record public comments on the FS and Proposed Plan. Approximately 70 people attended this meeting. A transcript of the meeting is available in the information repository (February 28, 1989).

OhioEPA

State of Ohio Environmental Protection Agency

Central District Office
P O Box 1049 1800 WaterMark Dr
Columbus Ohio 43266-0149
(614) 644-2055

Richard F Celeste
Governor

March 15, 1989

RE: Comments on Proposed Plan
for Bowers Landfill

Georgette Nelms
Office of Public Affairs
U. S. EPA, Region V
230 South Dearborn Street
Chicago, Illinois 60604

Dear Ms. Nelms:

Ohio EPA has several comments on the Proposed Plan for Bowers Landfill, Circleville, Ohio. Because of uncertainties not addressed or answered in the Remedial Investigation (RI) or Feasibility Study (FS), Alternative 4 may be viewed as an interim action rather than a final remedy. State ARAR's will only be met by Alternative 4 if the conditions at the site remain stable. If the conditions change, State ARAR's may not be met by this alternative. Therefore, a more detailed contingency plan for emergency removal and a more detailed ground water monitoring program are necessary if the selected remedy is to be accepted as the remedial action.

A detailed contingency plan and a more extensive ground water monitoring program must be included in the Record of Decision (ROD). Because U. S. EPA maintains that the States have only those rights set forth in Sections 113 and 121 of CERCLA and that the States are somehow precluded from enforcing State laws at NPL sites, addressing these issues during the design phase will not afford the State of Ohio substantial meaningful involvement in the initiation, development, and selection of the remedial action or insure that the remedy complies with State law. Given the limited role assigned to the State by U. S. EPA, considerable detail in the remedial alternative must be agreed to immediately if Ohio EPA is to concur with the ROD.

The Proposed Plan does not describe the contingency plan that will be implemented should the preferred remedial alternative fail. Therefore, the ROD should address those situations (e.g. detection of ground water or surface water contamination, erosion of the cap, damage to the fence, production of leachate or gas) that will trigger the implementation of the contingency plan. The ROD should also address the levels of contamination that will trigger the implementation of the contingency plan, the actions that will be taken as part of the contingency plan, and identify those who will carry out the contingency plan.

APPENDIX C

RESPONSE TO PUBLIC COMMENTS ON CONSENT ORDER FOR BOWERS LANDFILL CIRCLEVILLE, OHIO

JULY 1985

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
230 SOUTH DEARBORN ST.
CHICAGO, ILLINOIS 60604

REPLY TO THE ATTENTION OF

RESPONSE TO PUBLIC COMMENTS ON CONSENT ORDER FOR THE BOWERS LANDFILL CIRCLEVILLE, OHIO

JULY 1985

INTRODUCTION

This report contains U.S. EPA Region V and Ohio EPA's response to public comments received on the consent order between U.S. EPA, Ohio EPA, E.I. du Pont de Nemours and Company, and PPG Industries, Inc., under which Du Pont and PPG will perform a Remedial Investigation and Feasibility Study of the Bowers Landfill in Circleville Ohio.

Included are the public comments received during the comment period, and the Agencies' responses to them. The comments are condensed and paraphrased in Section I for clarity or to combine similar comments. The full text of each written and verbal comment is included in Appendix D. Because numerous detailed comments were received on the subjects of community involvement and splitting samples, specifically, the Agencies' response to those are detailed in Appendices A and B.

As called for in the consent order, a 30-day public comment period was held. The comment period began February 22, 1985. In response to requests to extend the comment period, written comments were accepted until April 24, 1985. A public meeting was held on March 14, 1985 in Circleville, at which oral comments were received.

CONTENTS

Section I - Agency response to comments
Appendix A - Response to comments on community involvement
Appendix B - Response to comments on split sampling
Appendix C - List of commenters
Appendix D - Written comments and transcript of March 14 public meeting
Appendix E - U.S. EPA memo of 10/84 regarding release of unreviewed data, and Hazardous Substances List

p. 1

Comments from ACTION

1. Contaminant plumes may have moved off site, and so would not be detected in the sampling plan as proposed.

   RESPONSE:
   It is unlikely that the contaminant plumes have moved entirely off the site, so the sampling sites in the immediate vicinity of the landfill are appropriate for this stage of the investigation. However, if the investigation should indicate a need for sampling farther off-site, the workplan allows for that. (See pages 4 and 15 of the workplan dated 5/29/84, which say that additional monitoring wells or surface water sampling can be added. The Quality Assurance Project Plan of 8/15/84, page 4 also says further investigation may be needed to define the extent of contamination. The need for further investigation will be determined as part of the RI report.)

2. Contamination could be over looked during droughts, so sampling should be required in the spring. Year-round sampling would give a better idea of the overall extent of contamination.

   RESPONSE: The workplan (page 15) requires sampling during low and moderate flows, so that samples will not be taken during drought conditions. The agencies want to find maximum levels of contaminants, so it isn't advisable to sample during flood times when contaminants would probably be diluted. Also, the sampling points may be inaccessible during flood times. However, if the initial rounds of sampling indicate a need for sampling during the spring, and the sampling points are accessible, that will be required.

3. Why isn't long-term sampling included in the agreement?

   RESPONSE: The consent agreement covers only the work needed during the remedial investigation/feasibility study phase of the project. The RI is intended to characterize the contamination from a site so that a decision can be made about the best actions to take at the site. By necessity, the investigation is limited in time. However, long-term monitoring is a very important consideration for the future, and will be considered during the feasibility study.

4. ACTION believes that a $400,000 ceiling has been placed on the cost of the RI/FS, and that the private parties don't have to pay for any costs beyond the original scope of the agreement.

   RESPONSE: There is no ceiling of $400,000 placed upon the cost of the RI/FS. The respondents' obligation is to complete a remedial investigation and perform a feasibilty study of the site in accordance with the RI/FS workplan.

5. The activities are strung-out over to long a time period. The activities should be scheduled simultaneously.

   RESPONSE: Some activities are overlapped to limit the amount of time the study will take. Our experience shows that it's difficult to complete a remedial investigation in less time than is currently scheduled, and we believe the schedule is realistic in light of the complex nature of the work.

6. Sampling should be required to obtain baseline data prior to the start of the RI.

   RESPONSE: Background samples (baseline data) are part of the proposed investigation. Surface water and sediment samples will be taken from the Scioto River upstream from the landfill. At least one monitoring well (W-9) will be located upgradient of the landfill site, from which soil and groundwater samples will be collected. Private wells located in the area also will be sampled. 25 soil samples, a number of which are located away from the landfill, should provide a reasonable basis to determine background soil inorganic concentrations near the site.

   Most of the organic contaminants of concern at the site do not occur naturally. Therefore, any occurrence of the manufactured chemicals would be above natural background levels. If upgradient sampling locations are also significantly affected by these contaminants, then further investigation might be warranted to differentiate the site-related contaminants.

7. Split samples should be provided to the community.

   RESPONSE: Addressed in attachment on split sampling.

8. Citizens must be notified prior to changes in sampling points, and should be able to provide input.

   RESPONSE: Addressed in attachment on community involvement

9. There are descrepancies between the Hazardous Substance List, the detection limits list, and the list of chemicals to be sampled at the Bowers site. Why aren't specific compounds being analyzed?

   RESPONSE: The Consent Agreement contains the correct CAS numbers for vinyl chloride and dichloroethane. The most recent Hazardous Substance List, and the detection limits for those substances, is attached. All parties analyzing samples during the site investigation will be required to use this most recent list. In addition to the substances listed, dioxin will be sampled for, using detection limits of 100 ppt for water, sediments and soil. O-xylenes will be analyzed under total xylenes. Endosulfan I and II are listed as Endosulfan alpha and beta, respectively, on the HSL. Clorodibromomethane is listed on the HSL as dibromochloromethane. 1,2 diphenylhydrazine won't be analyzed because it breaks down easily during extraction so results aren't meaningful. Analytical methods for acrolein and acrylonitrile are not effective. Flurotrichloromethane (referred to as dichlorodifbronomethane in the comment) does not appear in water samples. All samples will be disposed of according to applicable state and federal laws.

10. There should be quarterly public meetings.

RESPONSE: Addressed in attachment on community involvement.

11-13. There should be more than $11,000 allocated to implement the community relations plan. Monies not spent on community relations in one fiscal year, should be moved to the next. Community relations will not be performed if funds are not increased. Industry should cover the costs of community relations activities.

RESPONSE: As part of the administration of the Superfund program, Region V has resources (ie. staff time, travel budget) allocated to conduct community relations. Because there are so many sites, the Agency has contractors to assist the region's community relations staff. The contractors primarily prepare fact sheets, graphics aids for public meetings, etc. The $11,000 budget for contractor support for the Bowers site is separate from the RI/FS budget, and has already been obligated. Money not used one fiscal year is carried over to the next year. In our experience, $11,000 is more than adequate to supply the community with materials; the typical budget is $9,000. If more funds are needed, the region can request supplemental funds from Washington, or the work can be supplemented by in-house writers and graphic artists. The region has not found it appropriate to give the Respondents responsibility for producing community informational materials. It is U.S. EPA's policy to attempt to recover all costs for a site, including community relations funds.

14. There should be an evacuation plan and a warning system for the surrounding residents.

RESPONSE: Investigators from the Region's Emergency Response Section visited the site in May 1985 to assess whether any immediate threat may be posed by the site. The Agency concluded that there isn't a need for an evacuation plan during the RI/FS portion of the project. This decision is based on the following:

1) no air contamination was detected with specialized equipment used during the recent investigation;
2) the large distance on the downgradient side of the landfill between the drilling locations and the residences;
3) all drilling will occur outside the landfill boundaries so that any containerized material will not be affected;
4) because any gases encountered in the subsurface during drilling will be uncontained they will dissipate;
5) if any gases are released to the surface during drilling, the wide open area in which the landfill is situated allows for sample dissipation of gases, and
6) during drilling, the air will be continuously monitored.

A specialized Health and Safety Plan will be prepared for the site which will include an evacuation plan for site workers, consultation with the closest fire department, hospital, etc. A copy of the site-specific plan will be made available when it is completed.

15. There are discrepancies regarding the size of the landfill in various agency and legal documents. Also, the age of the landfill is referred to differently in various documents.

RESPONSE: The area to be investigated is the area of the property that was used for disposal of waste. That area is 12 acres, according to site records. On the long leg of the "L" shaped site, the landfill is 3000 ft north/south; it is another 1000 ft. in length on the short leg, which totals 4000 feet. The other dimensions are approximately 120-125 ft and 10-15 ft. The agencies consider 1958 or 1959 to be the year the site began operating, and 1968 as the year the site became inactive, although new information appears to show that the site closed in 1969.

16. The site should be fenced under the emergency criteria of the NCP because the site is being used for hunting, children's play and dirt biking.

RESPONSE: As a result of this comment, Region V's Emergency Response team evaluated the site in May 1985 to determine whether site access does pose an immediate health or environmental threat as defined by the National Contingency Plan. They determined that a fence is not necessary because:
1) the only unnatural material observed at the site was drums which all appeared to be empty, and plastic nonhazardous material, and
2) the site held a full spread of vegetation, which indicates that the topsoil may not be contaminated.

U.S. EPA will erect additional warning signs at the site, particularly at the small access paths along the west side of the site.

17. What is meant by trade secret? What types of information does this include? What recourse do citizens have to obtain information classified as CBI. All data should be released to ACTION.

RESPONSE: No information is being withheld regarding the site because it is considered a trade secret or business confidential, and we do not expect that any information generated during the RI/FS would meet the criteria for business confidentiality. The regulations explaining these concepts can be reviewed under Section 2.201-2.215 of the Code of Federal Regulations, and Section 149.43 of the Ohio Revised Code.

18. Any place the word "memorandum" is mentioned in the consent agreement, it should be replaced by "reports, documentation or sampling data."

RESPONSE: Whether a document is described as a memorandum or a report does not affect its confidentiality or make it exempt from disclosure. A document is judged on its content and not on its title. U.S. EPA does not withhold information only because it is labeled "memorandum."

19. Raw data should be provided to ACTION and the county health department at the same time EPA and industry receive it. Prior notice should be provided of any changes to the various plans.

RESPONSE: Addressed in the attachment concerning community involvement.

20. What are the standards for treating volatile samples?

RESPONSE: Volatile organic analysis of water samples must be performed within 7 days of the sampling date, and soil sample analysis must be performed within 10 days of the sampling date. Acid and base neutral extractable compounds, pesticdes and PCB water samples must be extracted within 5 days (10 days for soil) of sampling date and completely analyzed within 40 days of extraction. The holding time for low and medium concentration inorganic compounds, along with sample handling requirements, are listed in Appendix B, Table I of the Quality Assurance Project Plan.

A holding time is the period in which a sample remains stable enough to be analyzed, and therefore can be used to represent its source. "Not established" means the time is not a clearly defined number or a universally agreed upon number. In those cases, the agencies require that samples be analyzed in a timely manner that will allow the project to progress.

All samples will be taken, preserved, shipped and packed as indicated in Appendix B, Table I of the QAPP, as noted in the consent agreement.

21. Work should not continue unless EPA project directors are onsite. If not, industry should pay for a citizen representative to be onsite.

RESPONSE: As a result of this comment, and others received, U.S. EPA has arranged to have a representative from PRC Environmental Management, Inc. onsite overviewing all field activities to ensure that the PRPs comply with the Administrative Order and the National Contingency Plan. One representative will be on site during all field activities. An additional person will be on site when samples are taken. Ohio EPA plans to have a representative onsite during important field activities.

22. ACTION questions the U.S. EPA project manager's expertise.

RESPONSE: Erin Moran has an excellent educational and professional technical background, and is one of the senior members of Region V's Superfund staff. The role of the Remedial Project Manager is to manage and coordinate a number of technical projects and evaluations that are needed to successfully investigate a site. For specific parts of an investigation, the project manager may call upon the expertise of specialists who have specific training for that part and who can spend a great deal of time on that particular aspect. This is especially true for complex sites. It is not at all unusual for EPA project managers to seek assistance from a number of hydrogeologists, biologists, chemists or soil scientists, for example, to aid in a site investigation. At the March public meeting, Ms. Moran deferred questions to the hydrogeologist present because some citizens had specifically requested that a hydrogeologist attend the meeting. The region believes that Ms. Moran is able to fulfill the demanding job of project manager.

24. The gravel pitting operations around the landfill should be sampled, and if the gravel is contaminated, the pitting should be stopped. Signs should be placed around the perimeter of the landfill, and a gate should be placed at the SE entrance.

RESPONSE: A steel cable with U.S. EPA warning signs has been placed at the southern entrance to the site, which limits access to the Bowers Landfill and to Quarry B. OEPA has observed the site, and has determined that the cable prevents removal of gravel from the site. Because the gravel pit is upgradient of the fill, it is unlikely that the gravel is contaminated by the site. To be sure, the RI/FS workplan calls for one surface water sample to be taken from the quarry east of the site.

25. EPA shouldn't be able to override local and state laws when choosing remedial actions. The community should be given 60 days to comment on the final remedial action, and a public meeting should be held.

RESPONSE: The National Contingency Plan requires U.S. EPA to solicit public comments on its recommended remedial action for a site, and to consider those comments in making a final decision. EPA guidelines suggest a three week public comment period; however, the region can provide more time at its discretion, if it won't significantly interfere with the agency being able to take action at the site. A public meeting definitely will be held to discuss and take comments on the various cleanup alternatives.

U.S. EPA and OEPA are required under law to dispose of hazardous waste in a safe and proper manner, and both agencies will go beyond what is minimally required to be sure hazardous wastes are disposed of properly.

26. A public meeting should be held to explain decisions made on the basis of the comments.

RESPONSE: A public meeting will be held to describe the final consent agreement, and to explain how the comments have been responded to.

TRINITY LUTHERAN CHURCH
ALFRED KREBS

1. The industries responsible for the toxic waste problems at Bowers cannot be trusted to perform an honest investigation.

RESPONSE: The Superfund law allows U.S. EPA to have the parties considered potentially responsible for hazardous materials at a site to pay for and conduct investigations and clean ups under the close supervision of EPA. In fact, the agency is required to try to recover any money it spends from private parties. Having the responsible parties conduct the investigations saves public monies for those sites where no potentially responsible parties can be found. However, the agency still maintains control over the objectivity of the investigations. The parties enter into a legal agreement with U.S. EPA (and in this case, Ohio EPA also) that requires them to perform the work using plans approved by the agencies, to follow EPA quality assurance guidelines, and to submit all information to the agencies for approval.

MURIEL WRIGHT

1. Work should begin as soon as possible on the investigation of the Bowers Landfill, so the comment period should not be extended 30 days.

   RESPONSE: U.S. EPA and Ohio EPA extended the comment period on the consent agreement because of numerous comments received that 30 days was insufficient time to evaluate the complex workplans. The agencies determined that extending the comment period would not significantly affect the investigation schedule.

CITY OF CIRCLEVILLE, DEPT OF PUBLIC UTILITIES
JOHN A. JORDAN

1. Who will actually be doing site work needs clarification.

   RESPONSE: The work will be done by a contractor or contractors hired by PPG and duPont. As soon as the names of the specific contractors are known, they will be made public.

   CH2M Hill and Warzyn have contracts with the federal government, and have worked on this project until the present time. Another U.S. EPA contractor, Camp, Dresser, McKee, and PRC Environmental Management, Inc. will function as consultants to U.S. EPA and Ohio EPA as the agencies overview the work performed by the respondents and their contractors.

2. Has U.S. EPA received permission from property owners to do testing on the site and adjoining areas?

   RESPONSE: Under the consent agreement, Part II, the Respondents are required to gain access to the property to do the required work. Access to the landfill has been achieved, and that agreement is attached to the consent agreement in Appendix A. The Respondents also are required to obtain any agreements necessary to provide access to U.S. EPA, Ohio EPA and their authorized representatives.

3. Who will be on the project team?

   RESPONSE: Erin Moran is the Remedial Project Manager for U.S. EPA for the Bowers Landfill project. Lundy Adelsburger is the project manager representing Ohio EPA. Also, U.S. EPA has contracted with the firm

PRC Environmental Management, Inc. to represent Ms. Moran on site during all field activity to ensure that the Respondents comply with the consent agreement and the National Contingency Plan.

4. The city should have access to test data as it becomes available, particularly groundwater analyses. Who will do analyses for the agencies, and other parties.

RESPONSE: Addressed partially in attachment on community involvement. U.S. EPA and Ohio EPA contract with labs to perform the analyses. Other parties can have any lab that follows the Quality Assurance Project Plan for the site perform their analyses.

5. What steps will be taken to ensure that the monitoring wells don't contaminate the city's wells? Are 100 ft. wells deep enough? Will there definitely be a third round of sampling if information from the first two rounds is contradictory or inconclusive?

RESPONSE: Well drilling causes only very localized turbidity in the groundwater; any disturbance would be right at the installation point. Drilling wells through the landfill could potentially make conduits for contamination, so no wells will be drilled through the site.

Based on existing information on the site's hydrogeology and predominant types of contamination, the contaminated groundwater from the site is probably flowing into the Scioto River near the landfill. The proposed monitoring well system is designed to detect contamination going that way. There is a potential for contaminants that are heavier than water, such as chlorinated organic compounds, to sink within the groundwater flow system beneath the site. To ensure that this type of situation is adequately investigated, the Work Plan and Quality Assurance Project Plan will be modified to change the location and depth of the deep wells. Monitoring well P4B will become P5B at the southern tip of the landfill. All of the deep monitoring wells (P5B, P6B, and P8B) will be drilled to the underlying shale formation instead of to the 100 foot depth limit. The well screens will be placed just above the shale unless contaminated zones are detected above the shale as noted in the Work Plan and QAPP.

If sampling results are inconclusive or contradictory or are insufficient to allow the agencies to develop a plan for remedial action at the site, additional sampling will be required.

6. The Quality Assurance and Sampling Plan (pg 2, paragraph 2) incorrectly says the City maintains an infiltration gallery approximately one mile downstream from the site on the west bank of the river. That gallery was abandoned.

RESPONSE: The infiltration gallery was abandoned since the site Workplan was written. The plan will be changed to reflect this comment.

7. The OAPP says organic gases came off ponded water along the western edge of the waste berm. When was this done and what were the results?

   RESPONSE: During a site visit by U.S. EPA, OEPA, CH2M Hill, and Warzyn on February 23, 1984, an HNU photoionizer detected low levels (2.2 parts per million) of volatile organic gases immediately above a leachate seep on the west side of the north-south landfill berm. No other readings above background were reported during the site visit.

8. Will U.S. EPA split samples with Pickaway county, and if so, who will do analyses?

   RESPONSE: Addressed in attachment on split sampling.

9. Has U.S. EPA abandoned theory of one upgradient and three down gradient monitoring wells?

   RESPONSE: The three downgradient, one upgradient well is a requirement for monitoring sites under the Resource Conservation and Recovery Act. The quanity and location of wells installed during remedial investigations of CERCLA sites is based on the scope of investigation needed to identify a remedy for the site.

10. What will the monitoring wells be cased with?

    RESPONSE: All monitoring wells, except W-12 and W-13, will be constructed of threaded PVC well casings and stainless steel well screens. Monitoring wells W-12 and W-13 will be constructed with stainless steel.

11. The City wants a list of detection limits for samples.

    RESPONSE: The list is attached.

PICKAWAY COUNTY BOARD OF COUNTY COMMISSIONERS
DONALD STROUS, RALPH ANKROM

1. The county wants to submit names for citizen representation on the research project team.

   RESPONSE: Addressed in attachment on community involvement

2. Split sampling should be conducted during the testing.

   RESPONSE: Addressed in attachment on split sampling.

ORAL COMMENTS RECEIVED AT PUBLIC MEETING, MARCH 14, 1985

Most comments received at the public meeting were repeated in the written comments, and so are addressed in the preceding pages. The following comments were presented at the meeting, but not in writing:

1. *Page 42, Cynthia Gillen. Ohio EPA should send ACTION results from previous sampling.

   RESPONSE: Ohio EPA sent Ms. Gillen copies of sampling results from Circleville and Earnhart Hill Water District.

2. Page 79 Linda King. Will dioxin be tested for?

   RESPONSE: Dioxin will be sampled for in the first round of soil, sediment and groundwater testing.

3. Page 86, David Cannon. It is appropriate to extend the comment period by 30 days.

   RESPONSE: U.S. EPA and Ohio EPA extended the public comment period by 30 days.

4. Page 87-88, Linda King. Air monitoring should be addressed in the agreement.

   RESPONSE: Monitoring of air quality will be performed while investigators are onsite. This is primarily for the safety of onsite workers because of their close proximity to site contaminants, especially during well drilling and other activities that disturb existing conditions. However, the air quality monitoring will also be applicable to evaluating conditions that could affect the safety of nearby residents.

   The air quality monitoring consists of measuring volatile organic gases and explosive mixtures of gas. All soil borings will be monitored for volatile organic gases, as specified in the Work Plan, page 11.

5. Page 89 Gary Betts. Although some people distrust government and industry, he believes people will support an effort to get sites such as Bowers cleaned up.

   RESPONSE: U.S. EPA and Ohio EPA's goal is to get the site investigated and cleaned up if necessary, and we appreciate everyone's support.

6. Page 90 Ralph Dunkle. There is evidence that material is still being disposed of at the site.

   RESPONSE: U.S. EPA and Ohio EPA have no evidence that dumping is still occurring at the site, but any information to the contrary should be reported immediately to one of the agencies.

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* page numbers refer to the pages of the official transcript

7. Page 92-93 Mary Anne Edsall. Citizens will be exposed to contaminants during drilling.

RESPONSE: Contaminants during drilling are very unlikely to reach any citizen not actually on the site near the drilling. See also response to written comment on page three.

8. Page 95 Marsha Schneider. The order should include provisions to protect the rights and property of adjacent land owners.

RESPONSE: Under the consent agreement, the respondents are responsible for contacting the landowners and making arrangements with them for access to their property. By signing the consent agreement, the respondents have no more rights than they had previously concerning access to any land, including the Bowers Landfill itself.

9. Page 96-98 Dr. William Myers. 1) The County Health Department offers its assistance to U.S. EPA and Ohio EPA in conducting the investigation; 2) a full investigation is necessary; 3) the agencies didn't provide enough information to the public up to this point.

RESPONSE: 1) U.S. EPA and Ohio EPA appreciate the offer of assistance, and hope to work cooperatively with the health department throughout the Superfund project; 2) the agencies agree that a full investigation is vital to determining the type and extent of contamination at the site; 3) during negotiations with responsible parties, the agencies are unable to provide information that may have to be used for litigation if the negotiations should fail to result in a consent agreement.

10. Page 98 Cynthia Gillen. Judy Beck of U.S. EPA's Region V community relations staff said the region had successfully dealt with sites in floodplains. Ms. Gillen requests a list of the sites and how they were handled.

RESPONSE: Ms. Beck was responding by telephone in February 1985 to members of ACTION who were very concerned that the Bowers site was flooding. Ms. Beck indicated that unfortunately many landfills were put into wetlands and floodplains, so that the region has several cases of flooding Superfund sites. In saying that we had successfully dealt with the sites, Ms. Beck meant on an emergency basis, such as erecting berms or dikes, draining a site, or diverting water, in cases where contaminants threatened a water supply. Examples are Seymour and Enviro-Chem in Indiana, and A&F Materials in Illinois.

11. Page 99-100 Mark Scarpitti. 1) The gravel pitting should be taken into consideration when cleanup options are considered; 2) a clay cap might be "putting a lid on a bucket with a hole in it."

RESPONSE: 1) The need to take action on the gravel pitting will be based on results of the remedial investigation; 2) a clay cap may be considered as a remedial alternative during the feasibility study. Usually the purpose of a clay clap is to prevent rainwater, etc. from pushing contaminants further downward into groundwater, not to prevent the spread of contaminants already in the groundwater or soil. That problem would be addressed with another option.

12. Page 116-117 David Cannon. If U.S. EPA shares split samples with the community, provisions should be made for adequate quality control so the results will be useful.

RESPONSE: Addressed in attachment on split sampling.

13. Page 117 Mary Anne Edsall. The public comment period should be extended.

RESPONSE: The public comment period was extended by 30 days.

14. Page 121 Linda King. Will incineration be considered as a cleanup option if local laws prohibit incineration?

RESPONSE: All viable alternatives must be considered in evaluating the best method for cleaning up a hazardous waste site. Even if incineration is considered, it doesn't mean it will be chosen for this site. We can't speculate on future local laws that may come into effect, but every effort will be made to accommodate local concerns, and to clean up the site in a safe and environmentally responsible manner.

APPENDIX A: RESPONSE TO COMMENTS ON COMMUNITY INVOLVEMENT

Many of the comments received on the Bowers consent order concern citizen involvement in the investigation. The county commissioners requested that U.S. EPA and Ohio EPA include citizen representation on the "research project team." The citizens' group, ACTION, had several comments. They requested: prior notification of changes in any plan and in sampling points, quarterly public meetings, representation on the project team (they prefer a rotating membership), and all raw data. Other commenters suggested the public be involved in the project to the extent possible.

Both U.S. EPA and Ohio EPA believe that community involvement is a critical element in the success of a Superfund project. The agencies discussed the comments at great length, and have developed the following plan for fulfilling the residents' desire to be informed and involved in the project, and the agencies' obligation to keep the project scientific, on schedule and consistent with agency policies:

Information committee. U.S. EPA and Ohio EPA will develop a committee representing the county, city , citizens' groups ACTION and L-ECHOS to meet regularly with project staff and to provide documents for discussion and review. The meetings would occur at least every other month in Circleville, and would be open to anyone else who wished to observe.

Purpose: To disseminate reports, data, and progress reports related to the remedial investigation and feasibility study of the Bowers Landfill. To provide liaison function with the rest of the community. To provide input to U.S. EPA and Ohio EPA, although the committee will not be a decision-making body and will not have authority to override any agency decision.

Structure: One member should represent the Pickaway County Board of Commissioners, the city of Circleville, the Pickaway County Board of Health, ACTION, and L-ECHOS, Ohio EPA, U.S. EPA, the Respondents and perhaps one at-large position. Each organization would choose its member, but for the purposes of consistency and effectiveness, the agencies ask that the same member (and a designated alternate, if desired) serve throughout the life of the project.

Format: Throughout an RI/FS a number of documents and reports are generated that generally are not reviewed by the community. However, U.S. EPA and Ohio EPA are able to disseminate the documents under certain conditions. We anticipate that we would provide them to and discuss them with the committee. The following are documents that the Respondents will be required to provide to the government, and that EPA would then provide to the committee:

Work plan
QA/QC plan
site safety plan
geophysical survey
biological survey

-more-

We will make available second drafts (ie. after U.S. and Ohio EPA have reviewed) of the following:

RI report
Exposure Assessment (EPA will actually do this report)
Feasibility Study (this is always made available for public comment)

Raw data. We cannot provide raw data that has not been through quality assurance/quality control procedures. Attached is an October 4, 1984 memo from William Ruckelshaus, then administrator of the agency, which describes the Agency's policy regarding the release of unreviewed material. This policy is still in effect. Once the data from the site has been through the required quality assurance/quality control procedures, the agency can provide all data and not just summaries.

Representation on the project team. Several of the comments asked that citizens be put on the "project team." The information committee is in lieu of that request because U.S. EPA and Ohio EPA cannot put a citizen on the project team for the following reasons:

Members of the "project team" as defined by the consent order are authorized to 1) take samples or direct sampling, 2) stop work, 3) make minor changes in field work, 4) observe, record or photograph the work, and 5) review records, files and documents.

We are not able to give citizens the authority for numbers 1,2,3. Number 4 could be allowed only at a distance, as we are not able to allow citizens on the site for safety and liability reasons. Number 5 will be accommodated by the information committee.

5. Quarterly public meetings. ACTION requested that the agencies hold quarterly public meetings to inform the community of the progress at the site. If there appears to be need for the meetings, they will be held. However, it may be that the more regular meetings with the information committee will fulfill that function. In addition, U.S. EPA will provide regular written updates to the community.

APPENDIX B: RESPONSE TO COMMENTS ON SPLIT SAMPLING

In addition to the comments received during the comment period on the consent order, U.S. EPA received a petition from Circleville residents and a letter from William A. Myers, M.D., Pickaway County Health Commissioner, requesting that split samples be provided to the residents.

As allowed under the consent order, U.S. EPA will provide a representative of the Pickaway County Board of Health, a set of split samples. Dr. Myers offered his assistance in facilitating the provision of split samples from U.S. EPA.

U.S. EPA and Ohio EPA request that the analysis of these split samples strictly adhere to all the requirements of the Quality Assurance Project Plan for this site, which has been approved by EPA's Quality Assurance Office. The Respondents' samples and U.S. EPA and Ohio EPA's samples must also adhere to the requirements of the QAPP. The QAPP contains highly sophisticated, state of the art technical requirements which must be observed so that contamination at and from the site can be successfully classified. EPA will acknowledge only those samples that have followed the QAPP for this site.

ACTION further requested that industry assume financial responsibility for the citizen's splits. Respondents are only required to undertake the measures that EPA would undertake if EPA was conducting the RI/FS with federal money. EPA does not fund citizens' split samples because the scientific quality of the project is ensured by a QAPP, and citizen samples are redundant. EPA will not require the Respondents to finance the citizens' samples.

APPENDIX C: LIST OF COMMENTERS

Oral comments were received at the March 14, 1985 public meeting from:

1. David Cannon, PPG Industries, Inc.
2. Cynthia Gillen, ACTION
3. Linda J. King
4. Garry Betts, ACTION & self
5. Ralph E. Dunkel, ACTION & self
6. Mary Anne Edsall
7. Mark Scarpitti, Soil Conservation Service
8. Marsha Schneider
9. William A. Myers, M.D., Pickaway County Health Commissioner

Written comments were received from:

1. Linda King (December 22, 1984 letter regarding split samples)
2. William A. Myers, M.D. (January 9, 1985 letter regarding split samples)
3. Linda King, Mary Anne Edsall, and Cynthia Gillen, ACTION
4. Pastor Alfred Krebs, Trinity Lutheran Church
5. Muriel Wright
6. John. A. Jordan, City of Circleville, Department of Public Utilities
7. Donald E. Strous and Ralph W. Ankrom, Pickaway County Board of Commissioners

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Appendix D: Written comments and transcript of March 14 public meeting

(NOTE: The transcript includes only those portions with public comments; a complete copy of the transcript is available from EPA.)

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OhioEPA

State of Ohio Environmental Protection Agency

P.O. Box 1049, 1800 WaterMark Dr.
Columbus, Ohio 43266-0149

Richard F. Celeste
Governor

Re: Bowers Landfill Site
Circleville, Ohio
Record of Decision

Mr. Valdas V. Adamkus
Regional Administrator
U.S. EPA, Region V
230 South Dearborn Street
Chicago, Illinois 60604

March 31, 1989

Dear Mr. Adamkus:

The Ohio Environmental Protection Agency (Ohio EPA) has reviewed the draft Record of Decision (ROD) for the Bowers Landfill site in Circleville, Ohio. This draft ROD was prepared pursuant to the terms of the Administrative Consent Order signed in 1985 by U.S. EPA, Ohio EPA, E.I. DuPont de Nemours and Co. and PPG Industries, Inc.

Changes to the draft ROD which addressed Ohio EPA's concerns were discussed with your Remedial Project Manager, Erin Moran, on March 29, 1989. On March 30, 1989, we received from your contractor a revised draft ROD which incorporated those changes. With these changes, the Ohio EPA concurs with this unsigned, undated draft ROD, a copy of which is enclosed herewith and incorporated herein by reference for identification purposes.

Please feel free to contact me at (614) 644-2927 if you have any questions or comments regarding this matter.

Sincerely,

Richard L Shank

Richard L. Shank, Ph.D.
Director

cc: Maury Walsh, Deputy Director
cc: Kathy Davidson, OCA
cc: Deborah Strayton, CDO
cc: Jack Van Kley, OAG
cc: Paul Hancock, OAG
cc: Mary Gade, Office of Superfund
cc: Erin Moran, Office of Superfund
cc: Malcolm Petroccia, PPG
cc: Bernard Saydlowski, DuPont

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